

# PUBLIC HEALTH REPORTS

*In this issue*



U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
Public Health Service



*Armed Forces  
Institute of Pathology  
Building*

**Army Medical Center  
Washington, D.C.**

see overleaf



# PUBLIC HEALTH REPORTS

Published since 1878

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# The Armed Forces Institute of Pathology

One of the first institutions in the Washington, D. C., area designed to resist an A-bomb attack is the new 8-story building for the Armed Forces Institute of Pathology. Now under construction at the Army Medical Center, of which Walter Reed Hospital is a part, the building will house all of the activities ordinarily found individually in office buildings, research laboratories, hospitals, printing establishments, educational centers, and other public institutions. Steel-reinforced concrete blast-resistant walls enclose the main portion of the structure.

Closed-circuit color television for teaching purposes, X-ray suites, and animal-holding and animal-operating rooms are features of the design. Except for two small 4-story wings at the north and south ends of the building, the entire structure will be windowless. It will also be completely air-conditioned. Blast-proof doors will separate the wings, which are designed for expendability in the event of a major attack, from the bomb-resistant section.

To offset the physiological and psychological characteristics caused by the lack of windows, high intensity lighting will be installed throughout. Colors—light, fresh pastels and bright shades—will vary from floor to floor, from corridor to corridor, and from room to room.

Close coordination between Walter Reed Hospital and the Armed Forces Institute of Pathology will be facilitated by television communication, a modern system of pneumatic tubes to expedite handling of surgical specimens, and a tunnel connecting the two buildings and entering the Institute in close proximity to the autopsy area.

In surgical cases where rapid determination of a pathological finding is necessary, the television setup provides a direct and immediate link of communication—from the operating room to the laboratory. The surgeon will be able to see the slides as they are processed by the pathologist. At the same time, this medium of communication will make possible an interchange of discussion between both specialists without the necessity for either one leaving his working area. And at the same time, staff members and students can tune in on the demonstration.

Facilities are planned for a number of new activities: laboratories for investigative work in such fields as histochemistry, cytophysics, historadiobiology, histobacteriology—virus and tissue culture. Improved facilities for present activities include a small auditorium for staff conferences, classrooms, a seminar-type teaching laboratory, and conference rooms for department chiefs. Space will be provided for the anatomic pathology section of Walter Reed Hospital. The laboratories are placed back-to-back in the center of the building but are divided by a central service pipe core and surrounded by corridors. Offices and other nonlaboratory areas will be located adjacent to outer walls.

Occupancy is slated for the fall of 1954. The present home of the Institute is at Seventh Street and Independence Avenue SW., in Washington. The removal to the new building will leave the Armed Forces Medical Library in sole possession of the library-museum building presently occupied by the Institute.

*Drawing—courtesy of Faulkner, Kingsburg & Stenhouse, Architect-Engineers, Washington, D. C.*

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## Published concurrently with this issue:

PUBLIC HEALTH MONOGRAPH NO. 18 . . . The *Culicoides* of the eastern United States.

*Richard H. Foote and Harry D. Pratt.*

56 pages; 11 plates (126 figures). A summary and information on availability appear on pages 123-129.



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# Prenatal Health Examination Legislation

## —History and Analysis—

By LAURA M. HALSE, M.A., LL.B., and DOMINIC V. LIBERTI

THE PRIMARY PURPOSE of prenatal health examination laws is the protection of unborn children from congenital syphilis. Congenital syphilis is syphilis transmitted from an infected mother to her child in utero. Babies may be born dead or crippled or they may die young as a result of this infection. If, however, the disease is discovered in the mother during pregnancy and adequate treatment is instituted, most of the babies will be born free from syphilis.

Today, satisfactory serologic tests for the detection of syphilis and an effective therapeutic agent, penicillin, are available. Physicians agree that congenital syphilis is preventable and should not occur. Moore states that "congenital syphilis could be eradicated, or nearly so, by adoption of two procedures: routine diagnostic blood tests for syphilis in all pregnant women, and adequate treatment of the syphilitic women during pregnancy" (1). The prenatal health examination law is a legal effort to assist in the control of this disease. Through routine blood tests required by prenatal health examination laws, previously unknown cases of syphilis in pregnant women may be discovered. By treating the pregnant syphilitic woman, the unborn child is protected and

the disease is also eliminated in the infected woman.

### History of Legislation

On July 9, 1918, Congress passed the Chamberlain-Kahn Act, creating in the Public Health Service a venereal disease control division. This legislation provided, among other items, for allotments to State departments of health and set up specific regulations to be followed (2). One of these regulations stated, "The State health authorities shall take such measures as may be practicable for the purpose of securing such additional legislation as may be required for the development of control of the spread of venereal disease." Here is direct reference to the powers and responsibilities of States to regulate their health programs.

The Division of Venereal Disease in cooperation with State departments of health began the work of developing educational methods. Literature, lectures, films, lantern slides, exhibits, and placards advertising venereal disease clinics were prepared and put to use. No new legislation was contemplated nor suggested by the Division of Venereal Disease. An opinion of the United States Attorney General recognized the right of a community to enact laws to protect the health of its people.

### Committee on Social Hygiene

In 1920, the National League of Women Voters created the Committee on Social Hygiene (3). The purpose of this committee was

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to study the need for law enforcement against commercialized prostitution and measures for the prevention and control of venereal disease. The committee organized a staff to carry on its campaign and enlisted the aid of a number of religious, fraternal, and civic groups. Such organization periodicals as the Family Protective Association (Catholic), the Masonic Observer, the Knights of the Golden Eagle, the Loyal Order of Moose, the Independent Order of Odd Fellows, the Templars of Honor, and the Grand Lodge Ancient Order of United Workmen carried lead articles on venereal disease control. The committee's campaign aroused public interest and convinced many people that venereal disease could be controlled through education and application of medical knowledge.

Resolutions were passed by the Committee on Social Hygiene endorsing the Shepherd-Towner bill (infant and maternity care), which was enacted in 1921. Under this act Federal funds were made available on a grant-in-aid basis to various States for the purpose of developing maternal and child health programs. The law required that each State accepting Federal funds match part of these funds with contributions of its own and establish a responsible agency to administer the program. Gradually, many States set up permanent bureaus of maternal and child health care. This act lapsed after 8 years, but the policy of grants-in-aid to States for maternal and child health care was reestablished by the Social Security Act of 1935.

The committee also urged the enactment of legislation providing premarital and prenatal health examination protection against syphilis. The Division of Venereal Disease of the Public Health Service provided them with information on incidence, danger, prevention, and treatment of venereal disease. Until World War I, statistics on venereal disease were almost nonexistent, and until 1941 they were inadequate. The results of physical examination of men entering the Army provided, for the first time, definite data on the prevalence of venereal disease (4).

#### *First Baby Health Law*

In 1937, the *New York Post* published a series of articles sponsoring legislation for prenatal

health examination as protection against syphilis. The proposed legislation was called the "baby health law," a designation which became a popular rallying cry for the proponents of the bill. State and county officials led the campaign for its passage and social agencies, both voluntary and public, assisted in the campaign. New York State officials not directly connected with health activities spoke publicly for the passage of the "baby health law."

In March 1938, the prenatal health examination bill, the first of its kind, became a law in New York State. This model law greatly influenced health departments and social agencies throughout the United States. Other State legislatures were prompt to respond to the demand of public opinion for this type of protective legislation, and before the year was ended, New Jersey and Rhode Island had passed similar legislation.

By 1940, 19 more States had passed laws regarding prenatal health examination, and during the years 1943 to 1945, 11 additional States adopted such laws. At the present time, 42 States, Hawaii, the Virgin Islands, and Alaska have enacted prenatal health examination laws. Only Alabama, Maryland, Minnesota, Mississippi, Tennessee, Wisconsin, and the District of Columbia do not have any law covering this type of health protection. Voluntary social agencies, civic groups, and the American Social Hygiene Association have continued their campaign for prenatal health examination laws in the States which do not have such measures. They vigorously support local health officers who are attempting to get such legislation passed, and supply pamphlets and speakers for public health education.

#### **Scope of Laws**

The prenatal health examination laws are confined to blood serologic tests for syphilis. They are directed to the physician or midwife attending the pregnant woman. Persons permitted by law to attend a pregnant woman, but not permitted to take a blood test, are required to cause such a test to be taken by a physician licensed to practice medicine. However, in Georgia and North Carolina not only is it the responsibility of the physician attending the

pregnant woman to take a serologic test for syphilis, but it is also the responsibility of the pregnant woman to report to a physician and to request such a test be given to her during her pregnancy.

#### *Blood Test Requirements*

In 29 of the 42 States, a serologic test for syphilis during pregnancy is mandatory. In the other 13 States, a blood test is mandatory (a) except when the woman refuses to submit to a blood test (California, Colorado, Idaho, Utah, and Wyoming); (b) if there is no objection by the woman (Louisiana and Pennsylvania); (c) at the woman's request (North Carolina); or (d) if the woman consents (Kansas, Maine, Missouri, North Dakota, and Oregon).

#### *Time of Test*

In 34 States, a serologic test for syphilis during pregnancy is required at the first visit or examination for pregnancy, or within 15 days after the first examination. In Indiana, the law specifies that a test for syphilis be taken at the time of diagnosis of pregnancy; in Maine, at some time during the gestation period; in Rhode Island, within 30 days from the first professional visit; in Connecticut and Georgia, within 30 days after the first examination for pregnancy; in Louisiana, at the time of the first examination or as soon thereafter as possible; and in Missouri, within 20 days after the first visit to the physician.

#### *Type of Test and Payment*

All 42 States require that the physician submit a blood sample of the patient to a State-approved laboratory for a standard serologic test for syphilis.

In 33 States, serologic tests for syphilis are free if performed by the State laboratories. Tests are not free in California, Kansas, Massachusetts, Rhode Island, and Vermont. In Ohio, Pennsylvania, North Carolina, and Georgia, tests are free if the patient is unable to pay and upon request of the physician attending the patient.

#### *Filing of Results*

In 1937, the *New York Post* published a series with the State department of health in 16

States. No provisions are made for filing the results of the tests in Arizona, Arkansas, Georgia, Kansas, Massachusetts, Michigan, Missouri, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, and Washington. Results of positive tests only are filed with the State department of health in Delaware, Connecticut, Illinois, and New York. Results of State laboratory tests only are filed with the State department of health in Florida, Indiana, Louisiana, and Vermont.

#### *Requirements for Birth Certificates*

In 21 States, birth certificates must show whether a blood test for syphilis has been made. If there has been no such test, the reason must be given. In 10 other States, birth certificates must show whether a blood test has been made, but no reason need be given if the test has not been made. There are no blood test requirements for birth certificates in Maine, Massachusetts, Nevada, New Hampshire, New Mexico, North Dakota, Rhode Island, South Carolina, Texas, Virginia, and Washington.

#### *Penalties for Violation of Law*

In 13 States, penalties are exacted of the attending physician for violation of the law. In eight States, penalties are exacted unless the woman refuses to submit to a serologic test for syphilis.

#### *Decline in Rates*

The number of congenital syphilis cases in the continental United States dropped 47.5 percent from 1941 to 1952, while the number of primary and secondary syphilis cases declined 82.4 percent. The decline in the number of congenital syphilis cases was thus about one-half as great as the decline in the number of primary and secondary syphilis cases.

In 1952, 9,240 cases of congenital syphilis were reported in the continental United States; 25.4 percent of the cases in patients of known age were in children under 10 years of age. Much of the decline in the number of cases, however, occurred in that year, when a decline of 28.0 percent over 1951 took place. Conti-



mental United States data, by age, showed a 24.8 percent decrease in the number of reported cases of congenital syphilis in children under 1 year of age for fiscal year 1952 over fiscal 1951.

### A Continuing Problem

The continued occurrence of an entirely preventable infection, however, has been cause for much concern among both professional people and laymen. Various studies have been made in recent years to determine the probable causes for the persistence of congenital syphilis and also to measure the functioning and efficacy of the prenatal laws.

#### *California*

In November 1947, a report on a study of the effect of prenatal legislation in California covering the years 1938 through 1945 was published (5). The prenatal examination law requiring a serologic test for syphilis was enacted in that State in 1939. In 1938, 1 year prior to the passage of the law, 51 deaths of children under 1 year of age due to syphilis were reported. In 1945, 28 such deaths were reported—a drop in the rate per 1,000 live births from 0.50 to 0.15, even though there was an increase in the number of births during that period. In 1938, the number of reported cases of congenital syphilis in children under 1 year of age was 163, a rate of 1.60 per 1,000 live births. In 1945, 100 cases of congenital syphilis in children under 1 year of age were reported, a rate of 0.54 per 1,000 births. Although this study does not give a definite answer as to whether the enactment of the prenatal law has been largely responsible for the decrease of congenital syphilis cases in California, it does indicate a trend worth considering.

#### *North Carolina*

A similar study was made in North Carolina (6). Data covering the period 1941 through 1949 from three rural counties were analyzed. The prenatal law went into effect in that State on January 1, 1940. Blood tests for pregnant women increased from 51 percent in 1941 to 59 percent in 1949. This increase would seem to indicate that either the physician or the patient, or both, are slowly becoming aware of the im-

portance of prenatal blood testing for syphilis during pregnancy. The rate of testing among pregnant women delivered at home differed from the rate among those delivered in hospitals. There was also a great difference in rates between the different hospitals. Of all pregnant women delivered by a physician in a hospital, 69 percent received a blood test for syphilis; of those delivered by a physician at home, 42 percent received a blood test; and of those delivered by a midwife at home, 40 percent received a blood test.

It was found that 12.7 percent of hospitalized pregnant women received their only blood test for syphilis at the time of delivery. If a woman was delivered at home and there had been no previous blood test taken, there was little chance she would have a test at the time of delivery.

This study in North Carolina indicates that the pregnant women who are delivered at home, either by a physician or a midwife, or women who do not receive prenatal care and at onset of delivery engage an attendant for home delivery make up the group least likely to have a prenatal blood test.

It was also learned that some physicians screen their maternity patients for syphilis more thoroughly than other physicians and that some cases of congenital syphilis may go undetected through lack of administrative coordination. In the final analysis, this study indicates that it is not wise to assume that all pregnant women will receive a blood test for syphilis merely because the prenatal health examination law requires such a test.

#### *Baltimore, Md.*

In 1949, the Baltimore City Health Department investigated each reported case of syphilis in infants. Thirty-four cases were studied, 31 of which are reported in one study (7). Of the 31 mothers, 17 had no prenatal care during pregnancy. Of these 17 mothers, 9 had no previous history of syphilis, and 8 had syphilis from 1 to 9 years prior to birth of the infant. Three of the 8 women were presumed to have had adequate treatment; 2 had irregular and inadequate treatment; and 3 women had no treatment. Of the 14 who had prenatal care during pregnancy, 2 had blood tests which were



negative, 1 in the sixth month and 1 in the seventh month of pregnancy. Two women came to the clinic less than a week before delivery and delivered their infants before the results of the test were known. Six of the 14 women came for prenatal care from 3 weeks to 5 months before delivery, and their infections were known or were discovered in ample time for treatment to have been given.

#### *Atlanta, Ga.*

A clinical study of the factors responsible for transmission of congenital syphilis was made at Grady Hospital, Atlanta, Ga. (8). A review of the records of 77 women who delivered syphilitic infants indicated that the majority of those women acquired an initial or recurrent syphilitic infection late in pregnancy. Approximately one-fourth of these women had a negative serologic test for syphilis early in pregnancy and therefore did not receive treatment for syphilis.

#### *Massachusetts*

Fiumara (9) in his report on congenital syphilis in Massachusetts asked: "In view of the availability and efficacy of penicillin, the low syphilis rate in Massachusetts and the premarital and prenatal examination laws, why does congenital syphilis continue to occur in Massachusetts?" In order to determine the reasons for the continued occurrence, 59 cases were studied. On the basis of this study, the following factors were found responsible for the persistence of congenital syphilis in Massachusetts: (a) inadequate treatment of infected mothers; (b) infection of mother subsequent to initial negative blood test; (c) reinfection or relapse of the infected mother; (d) ignorance and carelessness of mothers in not seeking prenatal care; and (e) failure on the part of physicians to take a blood test for syphilis although the infected pregnant women visited their doctors more or less regularly during the gestation period.

#### **Steps Toward Prevention**

The many evaluation studies on the functioning of the prenatal health examination laws indicate an increased awareness on the part of

physicians and hospital personnel of the importance of prenatal blood tests for syphilis. However, there is an apparent lag among pregnant women in their awareness of the need for prenatal health examination.

Enactment and enforcement of prenatal health examination laws and education of the public and of physicians are important factors in the prevention of congenital syphilis. The following practices, properly utilized, should also aid in the control of this infection:

1. Premarital health examination laws.
2. Prenatal blood tests of pregnant women.
3. Repeated serologic test for syphilis during the last month of pregnancy. The need for repeated tests is recognized by physicians, but in large obstetric clinics many women easily may be missed. Uniform procedures for retesting should be established and carried out in every clinic caring for pregnant women.
4. Intensive case-finding programs to help eliminate the backlog of congenital syphilis cases. Programs might be aimed at groups within certain areas where syphilis prevalence rates are considered high and where little medical care is received. Children whose mothers did not have serologic tests during pregnancy or at delivery and those who did not have a blood test or treatment during the neonatal period even though their mothers were known to be syphilitic should receive attention.

A resource in a case-finding project to uncover missed congenital cases is the birth certificate. Thirty-one States require a statement on birth certificates as to whether or not a blood test was given during pregnancy and date of the test. Data compiled from birth certificates might designate areas, groups, and persons who may need special medical attention. A study of birth certificates filed for 1948 in South Carolina showed that 37 percent of tests were not performed or not reported (10). The study further revealed that more birth certificates signed by physicians did not contain the information regarding blood tests for syphilis than the certificates signed by midwives.

5. Education of pregnant women. All pregnant women should be urged to seek early prenatal care.

As shown by existing data, much has been accomplished toward the prevention of con-

genital syphilis, but much still has to be done, particularly in regions where comparative figures over a period of years show a lag in the decline of congenital syphilis rates. Concerted efforts of hospitals, health departments (through their programs for maternal and child health services and venereal disease control), obstetricians, and pediatricians could result in prevention of this disease. The cost of illness, the disability of the mother, and the possible illness, disability, or premature death of the child as a result of this disease cannot be measured quantitatively against the economic value of prenatal health examination. The persistent presence of congenital syphilis is a responsibility of and challenge to the professions of public health, medicine, and nursing.

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*A compilation of the prenatal laws now in effect in the States and Territories of the United States is available upon request to the Chief, Division of Venereal Disease, Public Health Service, Washington 25, D. C.*

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### Course in Laboratory Diagnosis of Virus Diseases

The Laboratory Branch of the Public Health Service Communicable Disease Center will present a course in the laboratory diagnosis of virus diseases at the Center's Virus and Rickettsia Section Laboratory, Montgomery, Ala., March 15-26, 1954.

Information and application forms should be requested from: Laboratory Training Services, Communicable Disease Center, U. S. Public Health Service, P. O. Box 185, Chamblee, Ga.

# Trends in Support and Expenditures For Medical Research, 1941-52

By IRVING LADIMER

**I**N ROUND NUMBERS, our Nation paid \$173 million for medical research in 1952 (the latest year for which analyses are available)—four times the amount spent 12 years ago. The largest share, \$73 million or about 42 percent, was the Federal Government's contribution. Medical research, however, came to less than 5 percent of the total investment in all scientific research and development. And Government's 42-percent support of medical research compares with Federal financing of 60 percent of all research.

In this country, substantial public and private backing of medical research dates back to the beginning of this century. Previously, support of learning went mostly to general education, religious teachings, and the humanities. Medical research, however, was not without its champions and donors. As far back as 1801, Dr. David Ramsey, in an address before the South Carolina Medical Society, noted with considerable interest the increase in giving and the beginning of organized research and support in England (1):

"Two novel institutions of this kind, the first the world has ever seen, reflect equal honor on England and the 18th century. One has been lately instituted for ascertaining, by experi-

ments, the precise effects of the newly discovered elastic fluids. The other, for the relief of cancerous patients, in which it is intended to give the utmost scope to medical ingenuity for discovering the best plan of treating that hitherto incurable disease. For this last purpose, one gentleman has lately given £3,000."

Public confidence in medical research was widely stimulated, and has never since flagged, by the dramatic discoveries of Pasteur and Koch which first revealed the tremendous possibilities of controlling disease through research. Interest and esteem rose with improvements in medical education following the Flexner report of 1910, and with realization of the results of successful coordination of clinical and biological work under the leadership of Sir William Osler at Johns Hopkins (2). Notable, also, was the evolution of the Public Health Service, after about 1910, into a truly national health agency.

It would be difficult, if not erroneous, to cite one cause or even major causes for the recent impetus in expenditures for medical investigation, both public and private. Any such list would undoubtedly include the greater public sensitivity to science, manifested in fear and hope generated by the atomic bomb, the general increase in public education and information, higher incomes, and tax regulations favoring nonprofit support. The remarkable scientific advances of the decade and the World War II achievements in meeting problems of military and civilian medicine have also made deep impressions.

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Most of this wartime research was coordinated and supported by Federal agencies. The Government's program of research in its own laboratories and, to a vastly greater extent, through contracts with universities, research centers, and industry demonstrated that military losses could be reduced or often completely avoided (3). Nearly \$25 million was spent on medical projects during 4 war years by the United States Committee on Medical Research of the Office of Scientific Research and Development (OSRD). Expenditures reached a peak of \$7 million during 1 year alone for projects of direct military interest (4). Parenthetically, funds for medical research were only 5 percent of the total OSRD investment in science to win the war.

Strong recommendations to continue "the war of science against disease" after close of hostilities were issued by Dr. Vannevar Bush (5), wartime director of OSRD. He particularly emphasized that "if we are to maintain the progress in medicine which has marked the last 25 years, the Government should expand financial support to basic research in the medical schools." Bush declared that it is "the special province" of the schools to foster research. He further recommended continuing support of medical research by the Government "if the concerted efforts of medical investigators which have yielded so much of value during the war are to be continued on any comparable scale during the peace." His report estimated that medical schools could effectively use \$5 to \$7 million during the postwar period for research and that a proposed national research foundation be empowered eventually to distribute \$20 million annually for medical research.

With some ebb in special areas, both medical research and general scientific effort have flowed onward in increasing stream. By 1952, support had reached its highest point, and, likewise, expenditures representing work accomplished attained their peak.

#### **General Scientific Research**

Activity in the health sciences is best understood in the historical perspective of the total research and development effort of our Nation. The panorama exhibits fairly small but steady

expenditures for science before the war, rising to peaks during the period of hostilities, followed by continuing growth through the immediate postwar and current periods, but with some decline in rate of growth. Price increases during this period also required greater expenditures; thus, research activity did not increase to the same extent as the increase in financial support. It is noteworthy that since the beginning of World War II, research expenditures have increased at a faster pace than general economic activity (6). Expansion both in research costs and in the gross national product (the market value of the output of all goods and services) reflects in part the decreasing values of the dollar.

#### *Support*

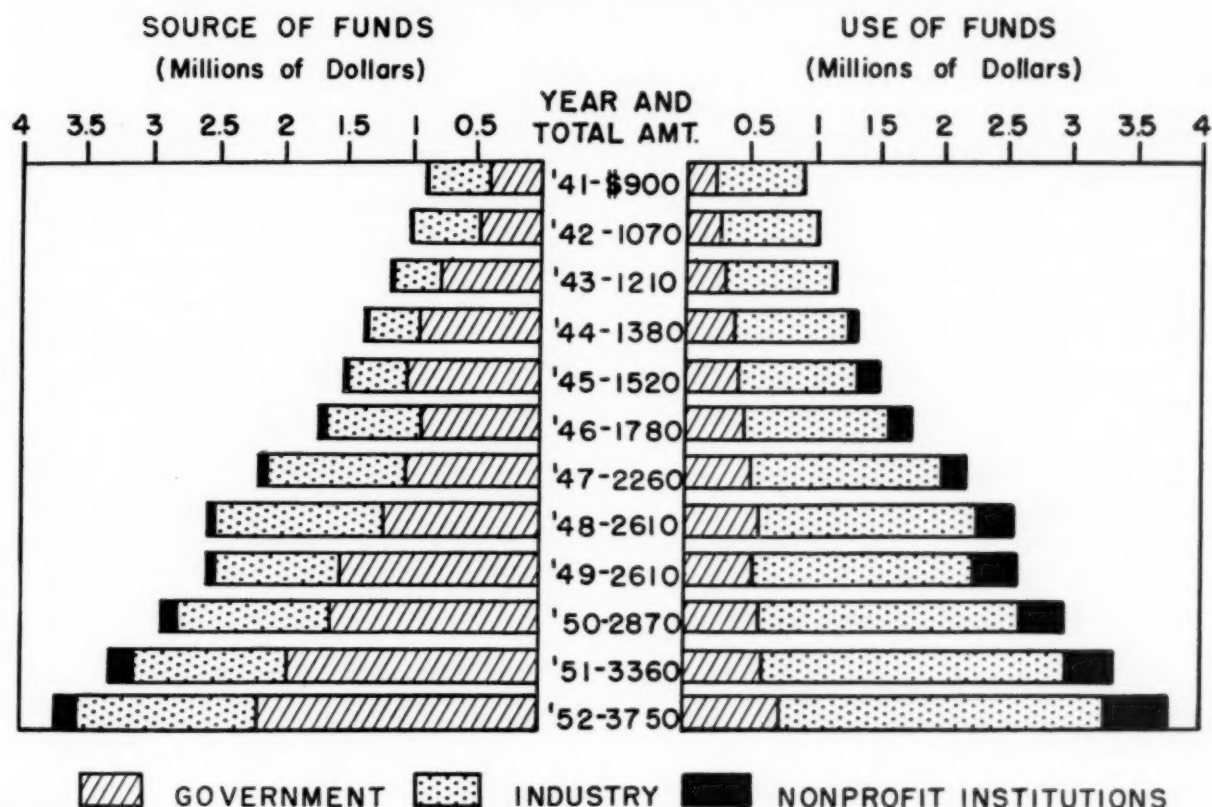
There has been a fairly steady rise in total research financing since 1941, according to a Department of Defense study (6), but with some significant shifts among the main supporters (fig. 1). Before World War II, industry financed the bulk of research, but during and after the war, the Government assumed this position, supplying about 70 percent of all funds at the war's end, 1945. Nonprofit institutions contributed between 2 and 3 percent throughout this period, thus keeping pace with the general increase. The 1952 support for all research and development, totaling \$3,750 million, represented over 10 percent more than the outlay for the preceding year and a 30-percent rise since the beginning of the Korean conflict in 1950. The last decade saw also the phenomenal growth of mass-supported voluntary organizations which contributed to research support, almost exclusively in the health fields.

#### *Personnel*

The corps of scientists and engineers has not grown at the same rate as expenditures. The dollar rise, although representing the higher cost of more and more complex weapons and industrial requirements, also reflects decreasing purchasing power; manpower has therefore not necessarily increased proportionately. According to the Department of Defense study (6), the number of engineers and scientists roughly doubled between 1941 and 1952—from 87,000 to 180,000—while, as noted, expenditures quadrupled.



Figure 1. National research support and performance, 1941-52.



SOURCE: Reference 6.

pled. Research manpower has grown at a fairly constant and rapid rate despite temporary decreases in research expenditures by Government and industry during the 12-year span.

#### Performance

In performance of research, measured by dollar volume, nonprofit institutions, such as universities and research centers, demonstrated the most rapid growth. Their share of activity increased from 5 percent in 1941 to 11 percent in 1952 (fig. 1). Employment of scientists in these institutions rose from 8,000 to 29,000 during the 12-year period. The Department of Defense report explains that these institutions, which "have traditionally performed the Nation's basic research, in the last few years have taken on many military research projects."

#### Comparisons in Research Support

Since 1941, medical research expenditures have been about one-twentieth of the Nation's

total outlay for research and development. Sources of support for medical studies changed markedly, however (table 1 and fig. 2). Impressive at once is the share assumed by the nonprofit and philanthropic agencies on behalf of medical research. Even before the war, nonprofit groups contributed well over a third of the medical funds, in contrast to about 2 percent for research generally.

#### War Period

During the war, in 1944, the shift toward more Federal support was evident in all fields of research, but with greater impact in the general research and development area which was heavily weighted by physical sciences and military development. For the Nation's research undertaking as a whole, Government support equalled 68 percent of the total \$1,380 million, about 3 times its prewar expenditure. In medicine, there was a similar tripling of outlay, but the Federal share was only 16 percent of the \$60 million estimated total.

### Postwar Period

Following the war, in 1947, funds for both general and medical research continued to rise; Government assumed about half the \$2,260 million for support of science generally and about a third of the \$88 million for medical research, Government funds accounting for virtually all of the increase in the medical field. The share of the nonprofit organizations in financing general research and development, as noted, remained at about 2 percent but rose slightly in the medical field, from 24 percent of the total expenditure in 1944 to 28 percent in 1947.

### Current Period

In 1952, the search for and application of scientific knowledge consumed about \$3,750 million, more than 1 percent of the gross national product.

In the consolidated national science effort, there were 3 main sources of support: the Federal Government, which financed about 60 percent; industry, about 38 percent; and nonprofit organizations, chiefly colleges and universities and their affiliated research centers, about 2 percent (table 1). And this aggregate does not credit the direct contributions of State and

local agencies or the millions of hours of free service contributed by physicians, nurses, and technicians whose work advances and makes possible biological and medical research. There are as yet no dollar data on these contributions, but their importance has been recognized. The Steelman report of 1947 (4) stated, "The modest sums which State and local governments have provided for research in medical and allied sciences have been allotted chiefly to State universities and medical schools, and to public health and welfare departments." No estimate of these funds was made, however. The National Science Foundation will attempt to obtain such data in its forthcoming national survey, and the American Medical Association's Council on Research has recently polled physicians and medical scientists to determine the magnitude of such research.

### Use of Funds, 1952

Although the bulk of all research funds in 1952 was supplied by the Government, Federal laboratories performed about a fifth of all work. Of the congressional appropriation of \$2,240 million in 1952, Government agencies

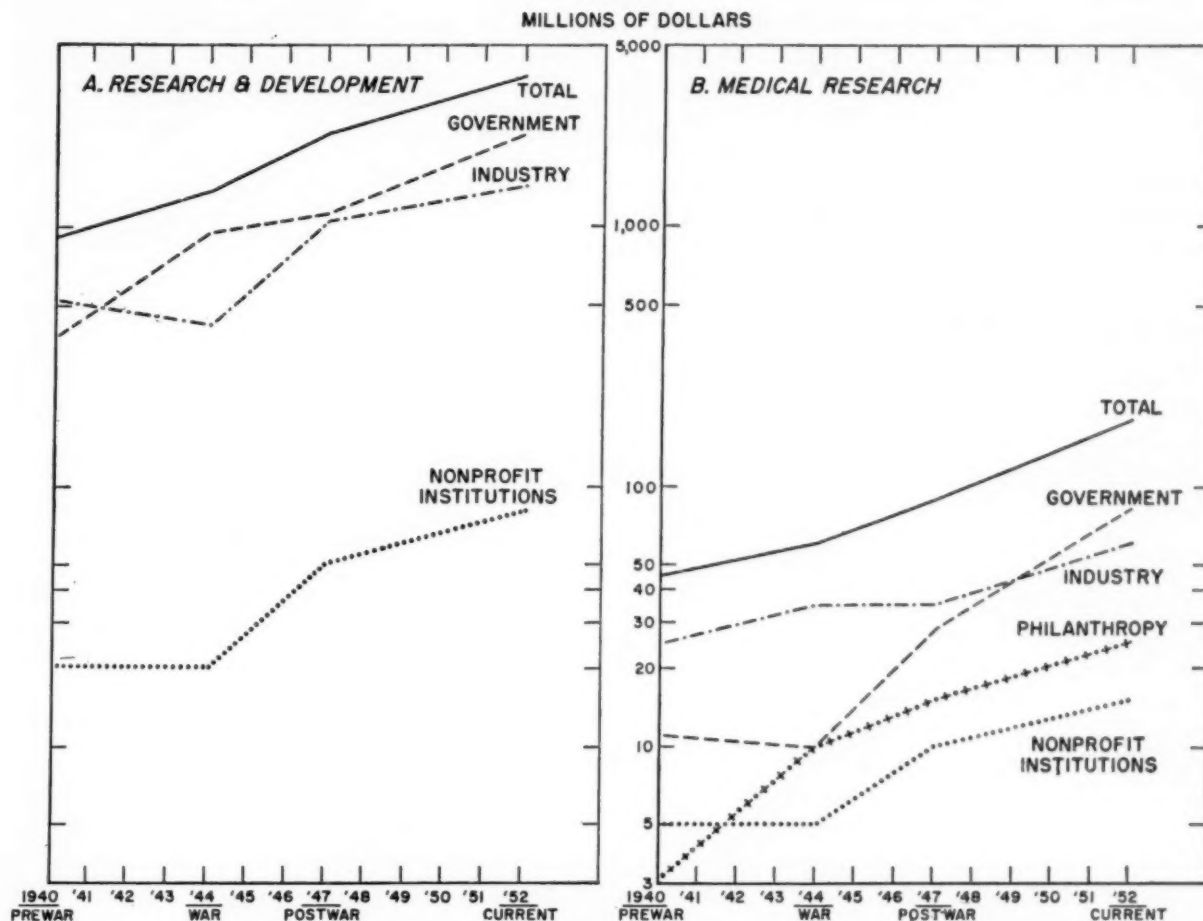
Table 1. General and medical research support, 1941-52

[Millions of dollars and percent distribution]

Source of funds	1941		1944		1947		1952	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
General research								
Government.....	\$370	41	\$940	68	\$1, 160	51	\$2, 240	60
Industry.....	510	57	420	30	1, 050	47	1, 430	38
Nonprofit.....	20	2	20	2	50	2	80	2
Total.....	900	100	1, 380	100	2, 260	100	3, 750	100
Medical research								
Government.....	\$3	7	\$10	16	\$28	32	\$73	42
Industry.....	25	55	35	60	35	40	60	35
Philanthropy.....	12	27	10	16	15	17	25	14
Other nonprofit.....	5	11	5	8	10	11	15	9
Total.....	45	100	60	100	88	100	173	100

<sup>1</sup> Estimated division: philanthropy, 0.5 percent; schools and research institutions, 1.5 percent.

**Figure 2. Support of general research and development and of medical research, 1940-52 (selected years).**



used about a third in their own laboratories and contracted or granted the remainder. Industrial contracts, mainly for applied or developmental defense projects, absorbed over half the Federal outlay (table 2).

Industry performed over two-thirds of the work, as measured in terms of money expended, utilizing \$1,390 million of industrial funds and \$1,140 million of Federal funds. Nonprofit institutions contributed about 2 percent of all funds, but spent 11 percent of the research funds. The Government thus depends on industry chiefly and on nonprofit agencies to conduct research and development. This pattern has developed primarily in response to military needs and is not typical of specialized areas such as medical research. A small amount of industrial and nonprofit agency funds was accepted by Government agencies, mainly in the form of gifts or grants for special projects or

individual fellows or scientists. Such outside support of Federal activity is too diffuse and small to be significant.

The Department of Defense study (6) calculates that 180,000 engineers and scientists, roughly a fourth of all our scientific manpower, were engaged in research and development in 1952. This total was derived by dividing average costs per worker into total expenditures. Since medical research costs totaled about 5 percent of the national investment in science and cost for support of medical scientists is somewhat lower than that for other scientists and engineers, perhaps about 12,000 physicians, scientists, technicians, and others worked in the field of medical research.

In general, distribution of the 180,000 scientists and engineers corresponded roughly to the funds used by each of the 3 participating groups, with a somewhat higher proportion in

the nonprofit sector. On the basis of average costs per worker in Government, in industry, and in the nonprofit institutions and colleges, the Department of Defense study estimated that these groups employed, respectively, 33,000, 118,000, and 29,000 scientists and engineers. Thus, these groups, which used, respectively, 21 percent, 68 percent, and 11 percent of the total funds, employed 18 percent, 66 percent, and 16 percent of the scientific manpower.

### Medical Research Support, 1952

The \$173 million spent on medical research in 1952 came from the same three principal sources which supported general scientific research: the Federal Government, industry, and nonprofit organizations. (This total compares with \$181 million for 1951 (7), the larger figure resulting chiefly from crediting all of the Atomic Energy Commission expenditures for biological studies as contributions for medical research.) Contributions in the medical field from nonprofit organizations, however, have been separated into those from philanthropy—foundations, trusts, and voluntary organizations such as the American Heart Association and the American Cancer Society—and those from schools, hospitals, and other institutions. Of the 4 participants in 1952, Government assumed the largest portion, 42 percent, and educational and other institutions, the smallest, 9 percent (table 1). This contrasts with 60- and 1.5-percent participation by these groups in support of general research.

Medical research attracted a far greater pro-

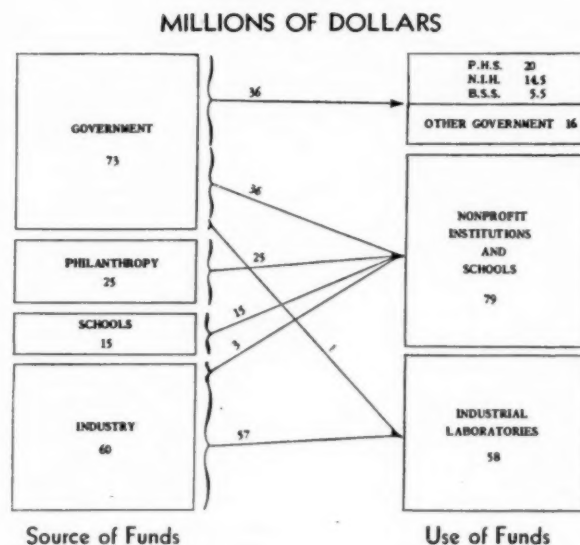
**Table 2. General research support and performance, 1952**

[Millions of dollars]

Source of funds	Use of funds			
	Government	Industry	Non-profit	Total
Government.....	\$800	\$1, 140	\$300	\$2, 240
Industry.....		1, 390	40	1, 430
Nonprofit.....			80	80
Total.....	800	2, 530	420	3, 750

SOURCE: Reference 6.

**Figure 3. Medical research support and performance, 1952.**



portion of support from educational and other nonprofit institutions than did all research in 1952 (table 1). Of \$50 million applied by the schools to all types of research, about a third, \$15 million, was used for medical research.

### Industry

The industrial contribution is estimated at \$60 million, but this figure is probably conservative since it is believed that pharmaceutical firms alone spent about \$50 million, mainly in the medical field (8-10). The industrial contribution to scientific research, although "by far the largest segment of the Nation's scientific research activity" according to a recent Department of Labor study (11), is the most difficult to estimate precisely. The Department of Labor undertook a nationwide survey of research and development for the Department of Defense in mid-1952 and obtained costs and personnel data by industry and type of research. For 1951, industrial expenditures for "basic and medical sciences" totaled \$147 million of which about \$66 million may be roughly attributed to medical research. This figure is closely comparable to the estimate used here, in view of differences in definition and widely varying industrial practices.

Three million dollars as the amount allocated by industry in 1952 to nonprofit organizations (fig. 3) is probably a fairly accurate estimate



of gifts and contracts made directly, not through an intermediary. This sum does not, however, cover substantial donations of corporations to fund-raising organizations which, in turn, supply funds for research. Contributions of the latter are credited as nonprofit support. For instance, the contributions of the Life Insurance Fund for Medical Research, of the Sugar Research Corporation, and of the Nutrition Foundation, all wholly industry supported, and the contributions of the corporation foundations established by pharmaceutical firms are counted as deriving from nonprofit sources. This growing technique in industrial philanthropy (12, 13) will require refined studies in the future in order to identify realistically industrial and other sources.

#### *Nonprofit Organizations*

Philanthropy supports a very small proportion of research generally, but it supports a substantial fraction of research in the medical field. Included in this category are not only the foundations, general and industry-sponsored, but also the voluntary organizations. These organizations serve almost exclusively in the health field, building, inspiring, and encouraging work and contributions to combat a specific disease. Primarily interested in education and, to some extent, in meeting costs of medical care, they also finance program research in medicine. In 1952, it is estimated that over \$12 million was contributed by voluntary organizations for research in some of the most significant disease areas:

	<i>Millions of dollars</i>
Cancer.....	\$5.3
Heart.....	1.6
Arthritis and metabolic diseases.....	1.0
Mental health.....	.3
Neurological diseases (including poliomyelitis and blindness).....	4.0

The balance of the \$25 million contributed by philanthropy came mainly from similar agencies supporting other fields (tuberculosis and aging, for example) and from the industry-financed groups. Precision in estimating contributions in this area is exceedingly difficult because of the numerous small foundations, individual gifts, and the variety of support tech-

niques employed. These sums are significant in aggregate but are not easily allocated. The total given is very conservative (14-16).

Analysis of nonprofit support reveals the significant shift from endowment income to corporate and voluntary contributions as major current sources of medical research funds, primarily those donated to colleges and universities.

Reports on expenditures and nature of research supported have been fragmentary and, although more and better data are now available than heretofore, it is extremely difficult to present a comparative picture. Perhaps the best analysis, based on admittedly incomplete data, of grants made by public and private agencies during 1946-51 was prepared by the National Research Council (17). That report significantly stated as its first conclusion, "Increasing governmental support of medical research has not diminished funds from private sources."

#### **Comparisons in Research Performance**

In 1941, before the Federal Government supported research extensively, industrial laboratories performed almost three-quarters of the general research, as measured by dollars spent, and Government laboratories, less than a quarter (fig. 1). Only 5 percent—\$40 million—was used by nonprofit groups, over half of which was financed from other sources. These relationships remained about the same during the prewar period, with the gradual emergence of schools and research centers as fiscally important participants. By 1944 and 1945, these nonprofit institutions performed 6 to 7 percent of research and development in terms of expenditures; at war's end, 7 to 8 percent; and currently, about 11 percent of all research. As noted earlier, a large part of this rise resulted from their increasing acceptance of military contract research.

The performance picture for medical research has always been radically different from that for general scientific research. In 1952, although the laboratories of nonprofit institutions performed only about 11 percent of the Nation's total research and development, they performed about half of all medical research.

**Table 3. Expenditures of Federal agencies for medical research, 1952**

[Thousands of dollars]

Agency	Life sciences <sup>1</sup>	Medical research			
		Total	Internal	External	
				Nonprofit <sup>2</sup>	Industry
Department of Health, Education, and Welfare.....	\$39, 176	\$38, 863	\$20, 250	\$18, 598	\$15
Department of Defense.....	37, 878	22, 100	12, 000	9, 100	1, 000
Atomic Energy Commission.....	22, 538	8, 513	521	7, 992	0
Veterans Administration.....	3, 872	3, 872	2, 572	900	400
Tennessee Valley Authority.....	2, 392	8	4	4	0
National Science Foundation.....	869	113	0	113	0
Total.....	106, 725	73, 469	35, 347	36, 707	1, 415

<sup>1</sup> Data from reference 18. <sup>2</sup> Based on data from National Science Foundation, Federal Funds for Science, I. Federal Funds for Scientific Research and Development of Nonprofit Institutions, 1950-1951 and 1951-1952, Washington, D. C., U. S. Government Printing Office, 1953, p. 40, table F.

About a fifth of all medical research was conducted in Federal laboratories, and about a third in industrial laboratories (fig. 3). These proportions are rough, but they reliably indicate orders of magnitude.

#### Federal Support and Performance

The Federal effort has proceeded through specialized agencies which conduct research, generally along with their functions for health maintenance and medical care, and which also have authority to contract for or support research outside their own laboratories and clinics. Of the \$73.5 million which the Government allotted to medical research in 1952, slightly less than half (\$35.3 million) financed research in Federal laboratories, and a little more than half (\$38.1 million) was distributed in the form of contracts, grants, and other outside funds, almost all to nonprofit organizations (table 3).

Until 1937, according to the President's Scientific Research Board (4), "virtually all Federal medical research was conducted by Federal agencies in their own laboratories." In 1947, more than half of Government medical research funds was spent by Federal laboratories. Today, more than half of the Federal funds is spent on extramural activities.

The National Science Foundation reports six Federal agencies which undertake medical research of some consequence (18). Figures are

in part derived from those collected for a wider range of activity covering the "life sciences," which include the biological, medical, and agricultural sciences. Medical sciences are those which, "apart from the clinical aspects of professional medicine, are concerned primarily with the utilization of scientific principles in understanding diseases and improving health." Calculations from the agencies listed indicate that medical research constituted over two-thirds of this "life science" total (table 3).

Estimates by the National Science Foundation for fiscal 1953 show some increase in life science research, but the largest increase projected is in the physical science area; a slight decline is estimated in the social sciences.

Although Government appropriations for fiscal 1954 register a further increase for medical research not generally true for other health activity, research funds will at most reach 4 to 5 percent of \$1,775 million, as estimated in the American Medical Association's review of the Federal budget (19). For the most part, Government health dollars go for hospitalization, medical care, and disease control, and are divided between direct operations and various payments to non-Federal agencies.

#### Intramural Research

The \$35.3 million devoted to medical research in Federal installations during 1952 represents activity of only 5 agencies. The Public

Health Service spent \$20.3 million, or almost 60 percent of the total. Research in the laboratories of the National Institutes of Health absorbed three-fourths of the Public Health Service total, the balance going mainly for studies and surveys of the Bureau of State Services. A small amount, not over \$25,000, covered clinical studies in the Service hospitals. In these allocations, medical research was fairly strictly defined, excluding vital statistics analysis, engineering and physical research, and allied disease control and social science studies.

Among other agencies prominently engaged in medical research were the Department of Defense and the Veterans Administration, the latter spending about \$917,000 on prosthetics studies alone. The \$521,000 listed by the Atomic Energy Commission as internal research represents the cost of administering the isotope distribution program. Otherwise, the Atomic Energy Commission supports medical and biological activity through contract arrangements with its "on-site" installations and "off-site" colleges, universities, and research centers. Although the former, including Argonne National Laboratory, Brookhaven National Laboratory, and Oak Ridge Institute of Nuclear Studies, are operated and closely controlled by the Commission, technically these units receive contracts for research and development and are thus not considered Government laboratories in the same sense as those at the National Institutes of Health or at Veterans Administration and Department of Defense centers. Atomic Energy Commission biological research totaled \$10.8 million in 1952. This program, although related to medical research, is not included in this report.

#### **Extramural Research**

In 1952, Federal agencies distributed \$38.1 million for medical research. The grant and contract programs are administered by the same agencies engaged in internal research, with the significant addition of the National Science Foundation. In 1952, its third year of operation, this agency, which is primarily dedicated to aiding fundamental investigation, granted \$113,000. The Atomic Energy Commission granted \$8 million, and the Tennessee

Valley Authority had a \$4,000 contract to one university for research on fluorine, equaling its internal expenditure for related investigations. The bulk of extramural money, however, came from the Public Health Service and the Department of Defense. Together they accounted for over four-fifths of Federal outgoing funds.

#### *Support and Purchase*

"It is important to distinguish between two different motivations which may prompt the Federal Government to sponsor research and development. In one instance, the Government's purpose may simply be to increase the body of scientific knowledge. In this case, the Government is supporting scientific activity. However, if it is seeking specific information to assist in carrying out a program (other than the support of research and development) for which it is responsible, the Government is then purchasing scientific services. Although in the latter case, the specialized nature of the object, the production of new knowledge may soften or blur the character of the negotiation, the relationship between the Government and the contracting institution is essentially that of buyer and seller (20)." This difference, as summarized by staff members of the National Science Foundation, must be recognized in evaluating the nature and magnitude of the Federal extramural programs.

The National Science Foundation estimates that of all Federal funds which went to non-profit organizations alone, only about 20 percent were for "support," the remainder being used to "purchase" research findings. In medicine, this ratio is more likely reversed. The largest extramural program, that of the Public Health Service, by itself accounts for and stamps half as in "support" of research projects. This program finances projects based on applications from outside investigators engaged in research in the many fields related to health and disease (21). Similarly, although the defense agencies use the contract mechanism, a substantial portion of their funds, especially funds administered by the Office of Naval Research, are "grants" to support basic inquiry. The Veterans Administration is authorized to enter into contracts or agreements with private and public agencies or persons.



Its extramural program of medical research is conducted with the primary objective of providing the veteran patient with the best possible medical care. Research is undertaken with the advice of the National Research Council, and individual projects are supported under reimbursable contracts with the institution at which the investigation is conducted. The present contractual program is intended to obtain information more economically or advantageously than is possible by investigations at Veterans Administration facilities.

Questions concerning methods of financing medical research, particularly at colleges and universities, have been raised by administrators and educators as well as scientists. Federal support of medical investigation, and of scientific studies generally, is of relatively recent origin. Policies relating to research grants and contracts are in a state of evolution. Interested agencies at both the supporting and receiving positions are seriously studying the many problems arising from a rapid increase in the volume of funds for medical research (22, 23).

#### *Recipients*

Virtually all the Federal medical dollars go to nonprofit organizations. The National Science Foundation classifies these broadly into educational institutions, hospitals and related institutions, independent research organizations, special research organizations (legally independent agencies formed at Government initiative and largely concerned with Government research), and miscellaneous organizations such as professional and trade organizations, public and governmental units, and cultural activities. Federal medical grants to nonprofit agencies were channeled mainly to educational institutions and hospitals and related institutions.

Some indication of the meaning or value of this support to the schools and hospitals may be obtained from a recent review of the Public Health Service grant program (24). It is stated that in the decade 1940-50 in which medical research has made rapid strides, the Federal Government has emerged as a major source of financial support. The pool of trained manpower increased as did the rate of scientific pub-

lication. Research activity is somewhat more widespread. Congressional earmarking of support for selected problems, even though broadly defined, has emphasized research on problems broadly relevant to specified diseases, such as cancer, cardiovascular disease, and mental illness.

Insofar as a quantitative impact on medical schools, specifically, may be measured, a report on the Public Health Service grant program (25) states: "In the fiscal year 1947-48, about \$4.2 million, or nearly one-fourth of all expenses for research budgeted separately in 4-year schools, represented research funds granted by the Public Health Service. These grants accounted for all the expenses for separately budgeted research in one school." The schools reported that not only the research function but also the teaching and training functions were aided by this form of Government support.

Although industry received a lion's share of all Federal funds for research and (mainly) development in 1952, it obtained only \$1.5 million in the medical area, almost all from the defense and veterans agencies. Pharmaceutical houses, instrument and scientific equipment laboratories, chemical firms, and special research centers were the chief recipients of contracts for the development of drugs, appliances, and special-purpose studies.

#### **Summary and Comment**

The contributors to medical research and participants in its performance have been substantially those which have played significant roles in the national research enterprise: the Federal Government, industry, and nonprofit groups. In support of all research, including medical investigation, the Federal Government has over the years assumed an increasingly larger share. Its contribution for medical research has been proportionately less than its contribution for general research, but it has increased at a faster rate. The current volume of Federal support for medical research is more than matched by that of other sponsors, notably industry and philanthropy.

In the use of research funds, nonprofit organizations, especially educational institutions, have increased their participation and, particu-



larly in medicine, have greatly enlarged their traditional role as principal conductors of research.

Support for medical research has remained at about 5 percent of the national total research support over the period 1941-52.

Medical research has largely been "supported," receiving financial assistance largely without policy or program control, whereas other research and development has been mainly "purchased" by Government and by industry to meet special needs.

This résumé of support and performance of medical research in terms of funds employed emphasizes the need for complete and comparable data. Not only is budgetary information in many areas nonexistent, but definitions and concepts are widely different. In view of the growing importance of medical and other research activity, it is satisfying to note the interest in establishing baselines and series which will indicate patterns and trends.

For this review, reliance had to be placed on fragmentary and uncoordinated materials. The best available published sources were used, but it was recognized that the selection of one authority or set of data from among conflicting reports presented some risk. It is believed, however, that the data used provide measures of trends and orders of magnitude sufficient for an evaluation of the relative participation of the principal groups in support and performance of medical research.

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# Studies on *Culicoides*

By GEORGE H. BRADLEY, Ph.D.



*Culicoides furens* (Poey)  
One of the "no-see-ums"

More than annoying, more than uncomfortable, these irritating insects seriously interfere with human efficiency and comfort and are a potential health menace which merits the attention of public health workers.

**B**ENEFITS from the phenomenal advances made in the control of insects subsequent to the discovery of the insecticidal value of DDT and other chlorinated hydrocarbon insecticides are nowhere more apparent than in the fields of medical entomology and public health. The reduction of malaria in many areas in which the disease was formerly highly endemic and its actual eradication from many others, together with the effective control of epidemic typhus, constitute, of course, the most outstand-

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*Dr. Bradley is chief consultant on medical entomology to the Bureau of State Services, Public Health Service. He has done extensive research on the anophelines of the United States, is a past president and director of the National Malaria Society, and has been a councilor of the American Society of Tropical Medicine and Hygiene. Dr. Bradley has participated in entomological activities of the Communicable Disease Center since 1943, prior to which he was associated with the U. S. Department of Agriculture.*

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ing examples of these benefits, but there are many others which are well documented in the literature.

Not so long ago it appeared to many that these new chemicals held a final answer to the insect control problem and that we soon should be living in a world free from insect-borne diseases and annoyances. More recently, however, it has been discovered that the new insecticides, although continuing to be of exceedingly great value, are not cure-alls. Many factors, in particular the development of resistance to insecticides in treated populations, operate to emphasize anew a cardinal principle in economic entomology, namely, that to devise the most effective measure for the control of any species, it is necessary to become familiar with the biology of the insect, particularly its physiology and ecology. Thus, although an enormous amount of effort continues to be expended on the chemistry and toxicology of insecticides, entomologists are being forced to devote an increasingly great amount of attention to fundamental studies on the various phases of in-

sect biology, in order to make effective use of the materials provided and to progress toward the solution of their many problems.

#### Importance of Insect Taxonomist

Basic to all such progress is the work of the insect taxonomist. It is he who is charged with developing a framework in which each different species occupies its individual niche in the scheme of things and with providing each species with a name and description which serves to identify that particular organism. This makes it possible for all recorded information gained through observation and experiment from whatever source to be cataloged and thus be properly related to the individual species to which it applies. To those unfamiliar with systematic entomology, that field of specialization which deals with the classification of insects, this might appear to be a relatively simple task. However, the number of insect species is immense. The list of described insect species numbers over three-quarters of a million, and others are being added continually. Great numbers of species are superficially similar, although their habits may be extremely diverse. This situation demands that the work of the taxonomist be exceedingly painstaking. The past contains many examples where confusion of species has led to costly errors in control work.

The insects of public health importance in the United States have received an immense amount of attention from taxonomists. With the possible exception of some of the muscoid flies and the mites, keys are available by which most of our disease-carrying or pestiferous insects can be more or less readily identified by trained personnel. From time to time, however, special groups of insects need to be worked over by interested individuals in order that accumulations of newly described species can be incorporated into existing keys or that new and improved keys can be prepared to simplify classification and identification procedure.

#### Occurrence in Eastern United States

Such a study has been made of the *Culicoides* of the United States east of the continental

divide and the results are presented in Public Health Monograph No. 18, published concurrently with this issue of *Public Health Reports*. This monograph includes a complete bibliography, and the sources cited in these comments will be found in that list.

Complementing this work are recent systematic studies made by Wirth on the *Culicoides* of Alaska (1951) and of California (1952). This latter work includes all of the known Pacific coast species.

Thus, information on the current status of this genus of insects in the continental United States, including Alaska, is now available to provide a basis for further work.

In 1949 the known species of *Culicoides* of the world numbered 360 (Vargas 1949a). Ninety-eight of these species occurred in the New World and only 30 of them were listed as occurring in the Nearctic region. This number has been considerably increased by current works which add several new locality records for known species and many descriptions of new species. Eight new species (7 from California and 1 from Alaska) are described in the two papers by Wirth and 4 new species are described by Foote and Pratt. Also, 4 new species and 1 subspecies recently have been described from Oklahoma (Khalaf 1952), which have not been incorporated into the regional works cited. It is certain that others will come to light as a result of the current interest in the genus.

Foote and Pratt discuss 35 species of *Culicoides* in considerable detail. Keys are provided by which adult females may be identified by either colorational or structural characters and by which the males may be identified by characters of the male terminalia. A series of 11 plates giving 126 excellent illustrations serves to facilitate greatly the use of the keys.

A section headed "Notes on the Species" contains references to the important literature of each species, discussions of differentiating characters, biological notes, geographic distribution, and seasonal occurrence. There is a marked paucity of information on the immature stages of *Culicoides* and it is pointed out that further progress in the taxonomy of the genus will require careful study of these forms.

In addition to their taxonomic studies and species notes, Foote and Pratt have provided



general summaries of information on the biology, control, and disease relationships of the genus as a whole. These summaries have served as a basis for the discussion of the genus which follows.

Among the variety of bloodsucking insects which attack man, none can be more annoying in the localities infested by them than certain species of *Culicoides*. They are popularly known as "punkies," "no-see-ums," or "sandflies" and they occur in greater or lesser abundance throughout the tropics and the temperate zones of the world. In medical literature the common name "sandfly" is well established for species of *Phlebotomus*, the transmitters of a virus disease of South America, the Mediterranean region, south China, and India known as sandfly fever, pappataci fever, or phlebotomus fever. The name "sandfly" as applied to *Culicoides*, therefore, perhaps is unfortunate, but there is little likelihood of change since it is the most common name used for these insects in many regions, particularly the South Atlantic and gulf coasts of the United States, where they occur in prodigious numbers.

#### **Culicoides as Disease Vectors**

As far as is known, no species of *Culicoides* transmits pathogenic agents in the United States or in Canada. In some other parts of the world, however, several species have been incriminated as intermediate hosts of certain filarial worms which infect man, and also as vectors of some virus diseases of domestic animals. Of chief interest among the species which are intermediate hosts of filarias which infect man are *Culicoides furens* (Poey) and *Culicoides paraensis* (Goeldi), the transmitters of *Mansonella ozzardi* in parts of South and Central America; and *Culicoides austeni* Carter, Ingram, and Macfie and *Culicoides grahamsi* Austen, the transmitters of *Acanthocheilonema perstans* (Manson) in Africa. *C. grahamsi* also is credited with transmitting *Dipetalonema streptocerca* (Macfie and Corson), a microfilaria which coexists with *A. perstans*. Large percentages of the human population in infected areas harbor these related filarial parasites. However, they usually produce no pronounced clinical manifestations and their im-



## Public Health MONOGRAPH

### No. 18

The accompanying article discusses the principal findings presented in Public Health Monograph No. 18, published concurrently with this issue of Public Health Reports. At the time the monograph was prepared, both authors were with the Communicable Disease Center, Public Health Service, Atlanta, Ga. The senior author, an officer in the Reserve Corps of the Public Health Service, has since been assigned to the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

Readers wishing the data in full may purchase copies of the monograph from the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C. A limited number of free copies are available to official agencies and others directly concerned on specific request to the Public Inquiries Branch of the Public Health Service. Copies will be found also in the libraries of professional schools and the major universities, and in selected public libraries.

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Foote, Richard H., and Pratt, Harry D.: The *Culicoides* of the eastern United States. Public Health Monograph No. 18 (Public Health Service Publication No. 296). 56 pages. 11 plates (126 figures). U. S. Government Printing Office, Washington, 1953. Price 40 cents.

portance is not established. Observations in Mexico have indicated that *Culicoides filariferus* Hoffman may transmit *Onchocerca volvulus* (Leuckart), which causes blinding filariasis. Gnats of the genus *Simulium* are the usual vectors of this organism and it may be that the filariae observed in *C. filariferus* were bovine parasites.

*Culicoides nubeculosus* (Meigen) and *Culicoides parroti* Kieffer transmit *Onchocerca cer-*

*vicalis* Railliet and Henry, the cause of fistulous withers and poll evil in horses in England (Steward 1933). *Culicoides pumgens* de Meijere and other *Culicoides* species are reported to be vectors of *Onchocerca gibsoni* (Cleland and Johnson), a filaria which infects cattle in the Federated Malay States. The worms cause large nodules to form on the brisket and flanks, and large losses result from injuries to hides and carcasses (Buckley 1938).

In addition to being the intermediate hosts of filarial worms of which man and animals are definitive hosts, it has been shown that *Culicoides* may transmit the virus which causes fowlpox of chickens and turkeys (Tokunaga 1937) and the virus which causes bluetongue of sheep (Du Toit 1944). Fowlpox is a common and widespread disease of poultry in the United States and, although *Culicoides* is not known to be a vector here, other biting flies, including several of our mosquitoes as well as the stable fly, *Stomoxys calcitrans*, have been incriminated as transmitters. Of particular interest at this time is information that bluetongue of sheep has become established in California and may be present in other western States as well. Previously the disease, which also may affect cattle, was not known outside Africa. In California the infections become apparent during the fall when sheep are moved from mountain pastures to the Central Valley where *Culicoides* and other biting flies are known to be abundant. As yet no reports of studies to determine the vectors of the disease in this country are available. Because of the importance of bluetongue, an act was passed by the 83d Congress on August 8, 1953, which added this disease to those animal infections which the Secretary of Agriculture, either independently or in cooperation with States, other political subdivisions, and individuals, is authorized to "control and eradicate" (James H. Steele, personal communication).

As has been mentioned, *Culicoides* may be of primary concern in the areas where they abound solely on account of the extreme annoyance caused by their bites. Reports of such ravages are common. One of unusual interest occurred during the recent war when the attacks of the Palau gnat, *Culicoides peleliouensis* Tokunaga, on troops stationed in Peleliu, Western Caroline

Islands, were so severe that not only was the efficiency of the men greatly reduced due to irritation and lack of sleep but in many cases scratching of the bites resulted in secondary infections which made hospitalization necessary (Dorsey 1947).

In the United States *Culicoides* have been notorious pests from early times, rivaling mosquitoes in their ability to make life so unbearable at certain seasons that the development of otherwise salubrious areas has been greatly retarded. Such areas are not difficult to locate along the coast of the southeastern United States, where large expanses of salt marshes provide favorable breeding grounds for *Culicoides canithorax* Hoffman, *Culicoides melleus* (Coquillett) and *C. furens* (Poey). These probably are the most important economic species in this country.

The larvae of *Culicoides* normally are aquatic, but those of some species are known to survive for several days in moist situations with no free water present, while others appear to be adapted to a life in moist soil or vegetable debris. Depending on the species, they are to be found in mud, sand, and debris at the margins of both salt- and fresh-water ponds, springs, lakes, streams, marshes, and swamps, and also in tree-holes, the slime-covered bark of trees, and manure pits. They are minute, white, free-swimming, eel-like creatures without legs of any sort. The larger species rarely exceed 9 mm. in length. They have biting mouth parts and have been observed feeding on decaying vegetation and on protozoa, algae, and other micro-organisms; some are reported to be carnivorous and cannibalistic. The larval stages of the salt-marsh species referred to in the preceding paragraph are said to last from 6 months to 1 year. When mature, pupation occurs, and the adults emerge in from 3 to 7 days. Observations indicate a life of some 10 days for the adult and that 3 or 4 blood meals are required prior to oviposition. The eggs are cigar- or banana-shaped and are deposited in masses of up to 30 in shady spots in the breeding places.

#### Biting Habits

Adult *Culicoides* are small flies, about 1 to 2 mm. in length and usually are gray in color.

One of the more apparent characters which distinguishes most species of *Culicoides* from their near relatives is the presence of cloudy spots and areas on the wings. As with mosquitoes, only the females are biting pests, the mouth parts of the males being unsuited for sucking blood. Biting habits vary considerably among the different species. In general, they are quite aggressive. They will crawl into the hair and under loose clothing to bite and will attack all exposed body surfaces. One who has not personally experienced an attack of these insects when they occur in such abundance as to resemble clouds can hardly appreciate the suffering they can cause. The bites of different species vary in severity and there also is variation in individual sensitivity to the bites of the same species. When only a few sandflies are around they frequently are felt before they are seen, which accounts for their "no-see-ums" appellation. The bites themselves are not painful, giving only slight pricking sensations. Later, wheals form at the sites of the lesions, and burning and itching may persist for several days. Some persons living in infested areas acquire a certain degree of immunity to the bites, but this is by no means a common phenomenon.

Sandflies bite at all hours of the day or night although their attacks appear to be most severe in the twilight hours. They are attracted to lights at night. Their activity is greatest during warm periods when there is little or no air movement. Observations in Alaska indicate that *Culicoides* were unable to fly in winds of 3.5 miles per hour and that adult activity dropped abruptly at temperatures below 55° F. (Travis 1949).

### Control

Early efforts to obtain relief from sandflies in infested areas included the use of smudges, repellents, and screens—measures which still retain their usefulness. However, smudges largely have been replaced by insecticidal fogs; old-time repellent concoctions of citronella, pennyroyal, and other aromatic oils have been succeeded by more effective modern preparations; and mosquito screens now are painted with DDT solutions or with mixtures of pyreth-

rum extract concentrate in lubricating oil to exclude sandflies from dwellings, thus eliminating the need for covering windows with fine muslin cloth, which shuts out air as well as sandflies. To the modern approaches also must be added the application of residual insecticides.

Of particular interest among control attempts was the work carried out to relieve annoyance from *Culicoides* during the inaugural meeting of the International Monetary Conference held March 8-22, 1946, at a resort hotel near Savannah, Ga. (Bruce and Blakeslee 1948). The report of this work has been summarized in the monograph as follows: "Residual applications of DDT, in conjunction with airplane spraying and thermal aerosols, were considered to be of most value. An oil solution of 5-percent DDT was applied, by mopping, to all window and door screens and to screen hoods fitted to all outdoor lights. A kerosene emulsion containing 2.5-percent DDT was applied to the garage, the kennels, and the understructure of the boathouse. A water suspension containing 1-percent DDT was sprayed to a height of about 12 feet on the walls of the hotel, the servants' quarters, and the surrounding shrubbery. The walled front of the swimming pool terrace and a balustrade around the pool were sprayed with a 2.5-percent DDT emulsion. These residual treatments, together with a subsequent regular spraying over the entire property with 5-percent DDT, reduced the biting incidence of *Culicoides* species in this vicinity nearly to zero. These authors also reported that thermal aerosols were fairly useful for emergency treatments when the sandflies were present in large numbers on the grounds. However, they considered this method of control to be of secondary importance to residual spraying or painting."

Reports of interest concerning the successful use of insecticidal fogs alone against *Culicoides* adults include a demonstration at a resort area in New York State (Glasgow and Collins 1946). A 5-percent DDT solution in kerosene was dispersed by a truck-mounted thermal aerosol generator at the rate of 0.2 pound of DDT per acre. Relief was immediate and lasted for 3 days. In a demonstration against *Culicoides* in Florida (Madden et al. 1946), a 200-acre swamp was



treated with a 5-percent DDT solution, by airplane, at the rate of 2 quarts per acre, which prevented sandfly annoyance for a 4-day period. Other reports are not so favorable, however. One of these concerns attempts to prevent attacks by *Culicoides* in Alaska by the use of heat-generated DDT aerosols. Here only temporary relief from annoyance was obtained; the flies infiltrated the control area immediately after disappearance of the fog (Travis 1949).

During and subsequent to World War II, an immense amount of work was directed toward developing repellents for use against insect transmitters of diseases. None of these has been recommended as highly effective against sandflies. However, progress has been made. Protection against *Culicoides* in Alaska for periods ranging from 42 to 49 minutes was obtained by the use of dimethylphthlate and a mixture of Indalone, "Rutgers 612," and dimethylphthlate in proportions of 6, 2, and 2 parts, respectively (Travis 1949). Another material, "B 800," a butoxy-propylene compound, is reported to repel sandflies for from 2 to 6 hours (Granett et al. 1949).

#### Reduction of Infested Areas

As in the case of mosquitoes, the most desirable approach to the control of sandflies in populated areas is by measures directed against their breeding places to prevent emergence of the adults. Early studies on this approach in the southeastern United States, principally at Savannah, Ga., and in St. Lucie County, Fla., were participated in by several workers (Dove and Hall 1934; Dove et al. 1932; Hull et al. 1934, 1939, and 1943). In general, it was found that salt-marsh sandfly breeding was concentrated in the soil of the wet, shaded portions of marshes and in ditches and other depressions which remain moist. On marshes which had been ditched for mosquito control, 90 percent or more of the sandfly larvae were concentrated within 10 feet of the ditch banks. Although some reduction in these populations may have resulted from the mosquito control drainage, it apparently was not sufficient to be reflected in any appreciable relief from sandfly attacks in nearby urban areas. Even with sandfly larvae thus concentrated along the ditches, the cost of

applying larvicides to increase the degree of control would have been prohibitive. Consideration was given, therefore, to ways for reducing the infested area. Based on the observation that sandfly larvae did not pupate and emerge in areas which were flooded continuously, an experimental marsh was diked and an attempt made to keep it covered with water. By the creation of such an artificial lake it was hoped to restrict sandfly breeding to its margins, where larviciding would be practical. Although theoretically feasible, this method was abandoned because of the impossibility of maintaining the entire marsh continuously flooded. The next approach was an attempt to dry up an entire marsh of 1,000 acres in extent by the construction of dikes to exclude tidewater and the installation and use of pumps and automatic tide gates to remove rainwater. Records indicate this method was feasible and effective. Sandfly emergence was reduced up to 90 percent as compared to emergence in uncontrolled areas. Satisfactory mosquito control likewise resulted, and effective control in the area was continued by the local mosquito control district for several years (Platts et al. 1943).

Although considerable interest in diking and pumping work was manifest in sandfly-infested communities prior to World War II, the method has not become widely used. The expense of the necessary installations is, of course, considerable—prohibitive in many communities which are surrounded by immense marsh areas. Also, the advent of the newer insecticides undoubtedly served to restrict diking and pumping projects. The use of these insecticides against adult sandflies already has been mentioned. As larvicides, they likewise have shown great promise. The following examples may be cited:

On Peleliu Island in the southwest Pacific *C. peleliouensis* was effectively controlled by treating large breeding areas with 10-percent DDT dust at the rate of 12 to 15 pounds per acre. A 3-percent DDT-triton-xylene emulsion at the rate of 3 gallons per acre also was effective, but coverage was more difficult to obtain (Dorsey 1947). In England tests were made with a solution of 5 percent of the gamma isomer of benzene hexachloride in miscible oil at a dilution of 1 part to 500 parts water against



the larvae of *Culicoides obsoletus* (Meigen) and *Culicoides impunctatus* Goetghebuer. The solution was applied so as to give a deposit of 100 mg. per square foot. Heavy rains subsequent to application increased penetration. It was concluded that the spraying of breeding grounds with this material prior to the expected emergence of a brood would provide effective control (Hill and Roberts 1947).

In the United States comprehensive tests with a number of sandfly larvicides are being carried on cooperatively by the Florida State Board of Health, the U. S. Department of Agriculture, and several Florida mosquito control

districts. In small-plot tests chlordane and heptochlor gave excellent control of larvae when applied at the rate of 0.25 pound per acre, while dieldrin, aldrin, and gamma benzene hexachloride gave similar results at 0.5 pound per acre. In practical tests, when used at the rate of from 1 to 2 pounds per acre, these materials prevented breeding in marshes for long periods. DDT at 2 and 4 pounds per acre and toxaphene at 2 pounds per acre gave poor immediate control and rather erratic results thereafter. Greatest residual toxicity was indicated for dieldrin—65 weeks when applied at 2 pounds per acre (Goulding et al. 1952).

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## From THE CHILD . . . . .

### Interagency Help for Migrants

The story of the achievements of the Rural Health and Education Committee in Fresno County, Calif., in alleviating the hardships among migrant workers in the lower half of the San Joaquin Valley is related by Mrs. I. H. Teilman (November 1953). On the west side of the county are great cotton ranches employing 10,000 migrant workers during peak crops. Most families live in isolated camps as semipermanent residents remote from the county's hospital, medical care services, and the established health and social agencies.

The nucleus of the interagency group was formed 3 years ago when the desperate situation of the seasonally unemployed migrants called for emergency measures. It was obvious that more could be accomplished by dovetailing the efforts of existing services than by the individual agencies working alone. Two of the most urgent needs were for health centers near the camps and care of the children while their mothers worked.

A health and welfare project was planned for the distressed families; a small committee which later became the Rural Health and Education Committee was organized; and the Rosenberg Foundation granted \$22,000 in 1951.

The 60-member committee today includes representation from the official health, social welfare, education, and employment agencies—from such groups as the Fresno State College, the State Youth Authority, the Red Cross, the County Medical Society, the National Council of Churches, and the Agricultural Extension Service. Other members include clergymen, businessmen, wives of agricultural laborers, and growers. One of the growers serves as chairman—a sign that the employers are alert to the community's needs and active in its efforts. Mrs. Teilman is vice chairman.

"The Committee realizes that its work so far is only the proverbial drop in the bucket," Mrs. Teilman says, but the achievements she recounts are impressive—clinics (general, medical, prenatal, and well-baby), a child-care center for children over 2, a full-time adviser in homemaking, classes in home nursing, recreational activities, and parent education.

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*The Child* has been changed in name to *Children* and is issued bimonthly beginning with the January-February 1954 issue. The new subscription rate is \$1.25 a year (\$1.75 for foreign mailing). Single copies are 25 cents each. The publication is issued by the Children's Bureau, U. S. Department of Health, Education, and Welfare.

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## Growth of the Health Center Idea

Tracing the development of health centers in Latin America since the beginning of the bilateral health program in 1942, the evaluators find evidence of significant advances. They conclude that the health center projects of the *Servicios* have had an important influence on the development of public health services to meet the varying needs of the countries.

**S**IGNIFICANT advances in the development of health centers in Latin America have been made since the inauguration of the cooperative health programs of the Institute of Inter-American Affairs and Latin American countries in 1942. The physician, the nurse, the statistician, the health educator, the social worker, the nutritionist, and the laboratory technician have all made contributions. The health center idea has been so convincingly demonstrated that Latin American health administrators have almost unanimously accepted it. Latin Americans attending schools of public health both in their own countries and in the United States have been exposed to it, and upon their assignment or reassignment to action programs they have usually become apostles of the concept.

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This is the fourteenth in a series of excerpts from the report of the Public Health Service's evaluation of a decade of operation of the bilateral health programs undertaken by the Institute of Inter-American Affairs in cooperation with the governments of the Latin American Republics. A complete list of excerpts is given on page 135.

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### War and Postwar Concepts

During World War II, medical posts were set up to give medical care to the people near military installations and to workers and their families in vital war materials projects. These centers provided primarily for treatment of diseases and inoculations and vaccinations of various kinds. The traditional preventive services were crowded out by a combination of a lack of personnel and the emergency situations which demanded attention.

With the exception of these medical posts, however, a large percentage of the health centers are providing maternal and child health, communicable disease control—including tuberculosis and venereal disease control—health education, and laboratory services. Some of the centers are operating programs in environmental sanitation, nutrition, and vital statistics, and a few have laundries and bathhouses.

### Administration

In some of the countries—Chile, for example—*Servicio*-constructed and *Servicio*-operated health centers are integrated into the health structure of the country. In others—

Bolivia, for example—they are completely independent. Although arguments for and against both concepts were presented, it is agreed that the aim should be the operation of the centers by the country itself as a part of the appropriate (national, state, or local) health service. Unless the health center becomes the focal point for the administration of health services to the area in which it is located, there is the possibility that there will be disunity or duplication of effort.

The problem of integration is sometimes complicated by the fact that in many countries there are special programs, usually concerned with the control of specific diseases, which are not administratively tied in with local health administration and health centers. These special programs—such as those for the control of malaria, yaws, pinta, typhus, and yellow fever—have developed because of the tremendous economic and social losses resulting from these diseases and the urgent need for their control.

### Construction and Operation

Except in Brazil, Mexico, and Chile, little progress had been made in developing health centers before the initiation of the bilateral health and sanitation program. About the same time that this program was begun, however, the Rockefeller Foundation extended its public health activities from Brazil and Mexico to other Latin American countries, and the programs of this organization and those of the *Servicios* have at times supplemented and complemented one another. A survey of health center construction and operation gives factual evidence that the health center has become an integral part of the public health programs of a majority of the Latin American countries in which bilateral health programs have been in operation.

In El Salvador, a few health centers were in operation before the *Servicio* developed its program of health center construction. Twelve centers constructed by the *Servicio* were turned over to the national health service for operation almost as soon as they were completed. Following the revolution of 1944, the *Servicio* had the nominal responsibility for operating

several centers for 2 years, but it is clearly evident that the Government of El Salvador is able to operate its health centers without assistance from the *Servicio*.

In Chile, at Valparaíso, Antofagasta, and Temuco, the centers are being administered by the national health service through the *Servicio*. Actually the *Servicio* exerts a strong influence on their operation. The Quinta Normal Health Center in Santiago, however, is being operated by the provincial health service, and the influence of the *Servicio* is more remote. It is apparent that the health center idea has been accepted in Chile, and the national health service is planning to develop centers in Santiago and the other large cities. It seems probable that in the smaller communities preventive services will be related closely to hospital and outpatient services which will be provided under a new law relating to the fusion of medical and welfare services.

In Ecuador, the center constructed in Quito has been turned over to the national health service for operation. The level of administration of the public health program is limited by lack of funds and personnel, but the center is well managed and is giving a high standard of service.

In Mexico, six centers have been constructed and two are under construction. Two of the six centers were operated by the *Servicio* for approximately 4 years, but are now being operated effectively by the health services of the country.

In Bolivia, nine centers have been constructed and put into operation by the *Servicio*, but the national budgetary resources are so meager that it seems improbable, considering other health needs, that funds can be found for their operation without outside assistance.

In Paraguay, where 5 centers have been constructed and 4 are being operated by the *Servicio*, a similar situation exists insofar as national finances are concerned. The question which logically arises is whether the *Servicio* is justified in demonstrating a health center program of the usual type in countries with very limited economic resources. Would it not be better to try to find a method of providing health services more in keeping with available funds?

In Brazil, the cooperative program is oper-



ating 45 health centers, 12 medical posts, and 30 subposts. Although few of these facilities have been turned over to the national or state health services, full responsibility for their administration is vested in Latin Americans, and only a small percentage of the operating expense is being carried by funds contributed by the United States.

In Colombia, four health centers have been constructed by the *Servicio*. Two of these were turned over to the Government immediately, and two were operated several years before being put under national direction. Approximately 30 medical posts and health centers operated by the *Servicio* during the war period have also been turned over to the Government.

In Costa Rica, 10 centers have been constructed by the *Servicio*, and all have been turned over to the Government for operation. All but 2 were operated by the *Servicio* for periods varying from 1 to 3 years.

In Guatamala, 6 centers have been constructed 4 of which were operated by the *Servicio* for 3 years before being turned over to the national health service for operation.

In Haiti, 3 centers have been constructed, 1 of which was operated for 3½ years before being turned over to the national health service.

In Honduras, 3 centers have been constructed. One was operated by the *Servicio* for 2 years before being turned over.

In Nicaragua, 7 centers have been constructed, all of which were operated by the *Servicio* for periods ranging from 2 to 3 years before being turned over to the national health service.

In Peru, four centers constructed by the *Servicio* are being operated by that organization. No definite plans have been made for turning them over to the national health service, although there are apparently no fiscal barriers.

In Uruguay, six centers have been constructed and are being operated by the *Servicio*. Here, as in Peru, fiscal barriers against turnover were reported as minimal, but in spite of efforts by the chief of field party, it has thus far not been possible to negotiate an agreement for turnover to the state or local health services.

Only in Venezuela, Panama, and the Dominican Republic was the construction or operation of health centers not a part of the *Servicio* program. In the latter, however, the national

health service placed in operation approximately 20 health centers and medical posts between 1937 and 1951.

## Planning the Health Center Program

Basic to planning a health center program are (a) a working knowledge of the specific health needs and the disease problems of an area and (b) an understanding of the cultural and social development of the people to be served, as well as the economic potential of a community.

### *Location*

Since one of the fundamentals of the health center concept is accessibility to the people to be served, a survey of the health needs of a country should be the basis for determining the location of a health center. Several instances were noted in which the location of a health center was dictated by a gift of property, and two in which a health center was planned as a part of a national health administration building, despite the fact that these locations were outside the area to be served.

### *Curative and Preventive Services*

Health center services should be closely coordinated with the curative services available in the area, and in most instances the centers themselves should provide some curative services.

Only in a few countries—Uruguay, for example—was the preventive concept rigidly adhered to in the health centers. However, the curative services provided in most countries were usually a concession to the demands of the people and were made available only because the people would not utilize the center unless these services were provided. A need for better balance between preventive and curative services in the health centers visited was clearly apparent.

### *Mobilization of Resources*

Planning of a health center program should include a study of all the health and welfare resources in the area to be served. This is particularly true since in most areas of Latin America these resources are rarely sufficient to meet



even the minimum needs. It is therefore essential that the best possible use be made of what is available.

A working relationship between the agencies and institutions giving health and welfare services, especially the health center and the hospital, should be developed. In some of the health centers, prenatal case histories are made available to the maternity hospital for the information of the physician or midwife responsible for delivery of the baby, and sometimes information from the maternity hospital is made available to the physicians and public health nurses of the health centers. Such arrangements, however, seem to be too infrequent.

The development of community health centers which provide other services as well as health services has a great deal of merit and should be considered in planning a program for a given community. In San Felipe, Chile, traditional health services are provided at the health center and at the related clinics of the social security organization, a few blocks away. In addition, the health center has an office for representatives of the National Department of Agriculture, who are assisting in the organization of homemakers' clubs, garden clubs, and 4-C clubs (corresponding to the 4-H clubs in the United States). The interest of the people in the health program is apparently greatly enhanced by the consideration and attention given these auxiliary operations by the health center. Moreover, these clubs have resulted in the development of gardens, vineyards, orchards, and poultry and pig raising, which augment the food supply of the low-salaried workers. They have also stimulated an interest in home sanitation, resulting in the replacing of dirt floors with concrete, the building of simple furniture for homes, and the providing of sanitary privies and other facilities—all tending to raise the level of health of the people in the area.

#### *Integration*

The health center program should include, in every possible instance, plans for making the health center an integral part of the indigenous health program of the community. Although it may be difficult to fix an exact date for turning the health center over to indigenous health services, a date should be included in the agreement.

If necessary, the date can be changed as the occasion demands.

### Physical Structure

Plans for the physical structure of a health center should not be started until a decision has been reached as to the services to be included in a health center. Physicians, nurses, and sanitation personnel, preferably those who will be responsible for the operation of the center, should be consulted early in planning the design of the health center.

The experience already gained by the *Servicios* can be of great assistance in planning future centers. Through this experience the mistakes of the past can be eliminated and the best features of the centers in the various countries can be utilized. This emphasizes the need for architectural consultative services early in the planning, before working drawings are commenced.

Structural design of health centers built by the *Servicio* is generally adequate. In some instances, the actual construction has suffered because of lack of skilled workmen and the necessity for using unfamiliar materials, which gave some structures a rather crude appearance. In one country, roof design for centers was of an untried type not conforming to the general architectural pattern of the country. Leaky roofs necessitated rather perplexing and expensive repairs.

### As a Training Center

A primary objective of the bilateral health program has been the training of health workers; physicians, nurses, sanitary engineers, and others. Health centers have played an important part in training, as was pointed out in the section of this report on that subject (December 1953 issue of *Public Health Reports*, pp. 1243-1250).

The importance of planning for the training program early so that adequate space will be provided in the center has been demonstrated. At the Beatriz Velasco de Aleman Center in Mexico, for example, it has already been found necessary to add a new section to provide adequate space for the nurse training program.

Plans must also be made to provide a staff sufficiently large to handle training. Experience both in the United States and in Latin America has shown that a training program cannot be simply added to the regular services of the health center. A minimum ratio of training personnel to trainees, depending on the kind of training and the content of the training courses, should be worked out.

### Quality of Service

In general, the services available in *Servicio*-operated health centers are of high quality. A few instances were noted of the use of outmoded drugs and of carelessness in hand washing after the examination of infectious patients, but the practices were generally sound.

One of the problems thus far not solved is that of keeping and using records. In some centers, patients' records are sketchy and inadequate. Physicians and nurses are often unable to obtain information regarding past treatment of a patient without time-consuming search. In some centers, a beginning in de-

veloping satisfactory records has been made; in others, there is a tendency to make records too complicated. The whole problem of records in health centers deserves immediate study and the development of a basic plan which can be adapted to use under varying conditions in the different countries.

In most of the countries studied, the collection of vital statistics has not been developed to the point where it is possible to relate health services to mortality and morbidity rates.

Evidence of decreasing infant and maternal mortality in the areas served by maternal and child hygiene facilities has been gradually accumulating. This was noted in San Salvador and Santa Ana, El Salvador; Quito, Ecuador; Lima, Peru; Santiago, Chile; and in other areas.

Programs of immunization have been successful in stopping epidemics of whooping cough, diphtheria, and smallpox. There is little resistance to these programs because the people themselves can see the importance and value of protection against these diseases.

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## Multidisciplinary Training in Public Health

The general plan and structure of our [public health professional] educational program is sound. It is based on a conception which we, in the United States, are apt to take for granted, but which is strange and unfamiliar in most other countries. This is the concept that public health is not a branch of medicine or of engineering, but a profession dedicated to a community service which involves the cooperative effort of a dozen different disciplines. The fact that doctors and dentists and nurses and engineers and health educators and microbiologists and statisticians and nutritionists sit together in our schools and take the same degrees is of incalculable importance. It is based on bold assumptions; but it has worked. It provides the only sure basis for true cooperative community service in the future. It constitutes one of the most significant contributions of the United States to the basic philosophy of public health.

—C.-E. A. Winslow, Dr.P.H., in *The Accreditation of North American Schools of Public Health*, American Public Health Association, 1953.

## Guide to Servicio Series of Excerpts



In this issue *Public Health Reports* publishes the final excerpts from the Public Health Service's evaluation of the health and sanitation programs cooperatively created and conducted during 1942-52 in 18 Latin American Republics by the Institute of Inter-American Affairs and the governments of the Latin American countries. These programs—developed largely through the *Servicio* administrative mechanism—have been concerned with many phases of public health: administration, program planning, disease control, professional and inservice training, environmental health, health education, and hospital and health center services. Principles and practices applicable particularly to international technical assistance programs but also to public health programs in general have been discussed. Criteria and procedures used by the evaluation team in assessing the accomplishments have been outlined. Suggestions which may serve as guideposts for further accomplishment in the advancement of health through cooperative efforts have been made.

Below are listed the sections of the report and the issue of *Public Health Reports* in which each appeared:

**Servicio: Ten years of operation of the bilateral health programs of the Institute of Inter-American Affairs—Introductory statements**, September 1953, pp. 829-831.

**Genesis and general structure**, September 1953, pp. 832-836.

**Assessment viewpoints and procedures**, September 1953, pp. 837-840.

**Use of anthropological methods and data in planning and operation**, September 1953, pp. 841-857.

**Organization and administration of bilateral public health programs in Latin America**, October 1953, pp. 1002-1008.

**The Servicio as an administrative device**, October 1953, pp. 1008-1012.

**Demographic characteristics of Latin America**, November 1953, pp. 1123-1126.

**Disease and nutritional barriers to health**, November 1953, pp. 1127-1131.

**Principles of public health program planning and their application in Latin America**, November 1953, pp. 1132-1138.

**Programs and problems in professional education and inservice training of health personnel**, December 1953, pp. 1243-1250.

**Development of environmental health programs**, December 1953, pp. 1251-1257.

**Health education in principle and practice**, December 1953, pp. 1258-1262.

**Progress in the development of hospital services in the Latin American Republics**, January 1954, pp. 92-98.

**Servicio contributions to hospital development**, January 1954, pp. 99-102.

**Growth of the health center idea**, February 1954, pp. 130-134.



# Progress in Poultry Inspection And Sanitation

By JAMES LIEBERMAN, D.V.M., M.P.H.

**T**HE UNPRECEDENTED expansion of the poultry processing industry in recent years is directly associated with significant changes in processing, storing, packaging, and sales methods, which are in considerable contrast to the days when most market poultry was incidental to the production of eggs. The changes in methods of processing poultry have brought to light many sanitation problems heretofore associated only with large-scale food processing operations.

Government control of food production and distribution is not a new concept. Since medieval times the increasing complexities of our civilization have demanded intensification of vigilance over the food industry. This is not merely for the sake of regulation, but principally because the age-old concept of caveat emptor—let the purchaser beware—no longer seems to apply. One author stated that “it has been discarded as being without justification in the

uneven balance existing between manufacturer and consumer” (1).

Although poultry and poultry products are nutritious and appetizing when wholesome and properly processed, like any other food they can transmit disease to man when they are contaminated with pathogenic organisms. Poultry meat which is derived from diseased birds or which becomes contaminated with harmful organisms during processing or subsequent handling is a hazard to human health.

Epidemiologists are aware that poultry constitutes an important animal reservoir of disease organisms affecting man. Such diseases may be transmitted to him through direct contact with birds on the farm, during the processing procedure, or through the consumption of poultry or poultry products. In addition, the large number of foodborne disease outbreaks which are not due to the food products themselves but to their contamination by careless food handling and by service personnel must not be disregarded.

Poultry processing plants may be located hundreds or thousands of miles from points of consumption. Poultry and poultry products are handled by numerous workers and often remain in storage for extended periods of time. It is difficult for the consumer in one part of the country to determine through his regulatory agency the fitness of birds that have been processed in a distant section.

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*Dr. Lieberman is special consultant on poultry inspection and sanitation on detail from the Communicable Disease Center to the Milk and Food Branch, Division of Sanitation, Public Health Service.*

*This paper was presented at the 57th annual meeting of the United States Livestock Sanitary Association in Atlantic City, N. J., on September 25, 1953.*

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## Inspection and Sanitation

In a poultry hygiene program two facts must be kept in mind. First, poultry is a food product that must be carefully processed and handled to be safe for human consumption and, second, in lieu of surveillance by individuals, public service agencies have been designated to protect the interests of consumers.

On the Federal level, the United States Department of Agriculture conducts a two-phase voluntary program, involving inspection and sanitation. Approximately 15 to 20 percent of processed poultry is covered by its provisions. The Food and Drug Administration of the Department of Health, Education, and Welfare helps to assure the wholesomeness of poultry which is shipped in interstate commerce. This is accomplished through the inspection of the establishments where these produces are processed and by the examination and condemnation of lots of poultry which are known or suspected to be adulterated or otherwise unfit for human consumption.

However, a large proportion of poultry is consumed in the same locality of a State in which it is originally processed. Probably less than 30 percent of the poultry processing in this country is supervised by programs of the United States Department of Agriculture and the Food and Drug Administration, and only rough estimates are available as to how much of the remaining 70 percent is supervised by State and local regulatory officials. Unfortunately, processing of the majority of this poultry does not receive any, or only cursory, supervision.

To improve some of these situations, various ordinances and regulations have been adopted by States and communities. Some are adequate and well formulated; others are based primarily or partially on revenue raising factors. Trade barriers flourish under the latter type of ordinance, the strength of which is dependent upon minor differences between it and the regulations that exist elsewhere. Sincere and honest public officials do not support any measure which is in restraint of trade, and which may eventually affect the health and nutrition of the people.

The trade-barrier type of ordinance was dealt with severely by the United States Supreme

Court in 1951 in its decision in the case of the *Dean Milk Company v. The City of Madison, Wis.* According to provisions of a municipal ordinance it was unlawful to sell any milk within the municipality as pasteurized milk unless it had been processed and bottled in an approved pasteurizing plant within a radius of 5 miles from the central city square. The court held that these provisions were discriminatory and that a municipality cannot curtail interstate commerce—even in the exercise of its unquestioned power to take appropriate measures to protect the health and safety of its people—when reasonable, nondiscriminatory alternatives, adequate to conserve legitimate local health interests are available (2). The alternatives suggested by the court were: (a) inspection by municipal officials of distant milk sources, for which the receiving municipality could charge the actual and reasonable cost of such inspection to the shipping producers and processors, and (b) adoption of the provisions of the Milk Ordinance and Code recommended by the Public Health Service, which imposes no geographic limitation on location of milk sources and processing, but excludes from the municipality milk not produced and pasteurized in conformance with standards as high as those enforced by the receiving city. If the same principle is applied to regulations for marketing poultry, the courts will be justified in holding as invalid any ordinance or set of regulations that will prevent the free movement of other wholesome foods in interstate and intrastate commerce.

### Need for Standard Ordinance

Health officials believe that a standard model ordinance covering poultry inspection and sanitation is needed, similar in scope to the Public Health Service's recommended ordinances and codes regulating milk and eating and drinking establishments. On a number of occasions, the conference of the Surgeon General of the Public Health Service with the State and Territorial health officers has indicated concern over the inability of our present programs to protect adequately the consumer of poultry and poultry products. At its meeting in Washington, D. C., in December 1952, it was recom-

mended "that the States strengthen their State and local programs for controlling the hazards associated with the processing of poultry, including, but not limited to, such items as inspection for wholesomeness and sanitation in storage, transportation, and retail sales; and that the Public Health Service continue to apprise the State and Territorial enforcement agencies concerning progressive codes for conducting effective poultry inspection programs" (3). In October 1952, prior to the issuance of that resolution, the United States Livestock Sanitary Association, through its Committee on Meat and Milk Hygiene, stated: "Your Committee recommends the setting up of local administration and enforcement of poultry sanitation and poultry inspection. Model ordinances for both poultry sanitation and poultry inspection should be formulated" (4). Elsewhere in the proceedings, it was emphasized that nothing can be found in the methods or economics of the poultry industry that would not adapt itself to the presently accepted methods for controlling milk production. The report went on to say: "To assure widespread uniformity and acceptance of the product, a system of public health scoring by areas should also be established."

#### **Proposed Poultry Ordinance**

Early in 1952, in anticipation of needs in this area of public health, the Public Health Service formulated plans for the conduct of a poultry hygiene program. Later that year, leaders of the poultry industry, realizing the apparent need for uniform standards, offered to assist the Service in developing the first part of a two-part model poultry ordinance. This portion, devoted to sanitation, will serve as the basis for relieving existing inadequacies in the processing and handling of poultry and poultry products. Shortly thereafter, a public health liaison committee was established to review the progress made in the development of the ordinance and to offer suggestions for its improvement. This portion, part I, entitled "Sanitation" was released to health jurisdictions, to professional veterinary associations, and to the industry, for review and comment. The final draft has now been prepared, includ-

ing many of the comments received in response to the request of the Public Health Service. It is scheduled for publication early this year.

The detailed sanitation requirements contained in the ordinance are those which cannot be compromised from a public health standpoint. They are essentials that can be complied with by large and small operators without hardship to either group.

Buildings must be conducive to sanitary maintenance; rodents and insects must be built out. Products cannot be contaminated by improperly collected refuse, by equipment which is not constructed, located, operated, and maintained properly, or by employees who do not have proper facilities for washing their hands thoroughly at lavatories properly provided with soap and sanitary towels. The importance of prompt chilling and refrigerating facilities is emphasized. These are but a few of the provisions that will guide the plant operator to more effective operation.

The Public Health Service believes strongly that a poultry regulatory program is not complete without provision for antemortem and postmortem inspection of poultry for wholesomeness by competent personnel. Therefore, part II, entitled "Ante-Mortem and Post-Mortem Inspection" is being prepared to complete the two-part document. This portion will be released after thorough review by experts in poultry hygiene outside of the Public Health Service.

Many questions remain unanswered with respect to the successful application of inspection procedures on the local or State level. This fact alone, however, should not prevent jurisdictions from embarking on programs of this type as soon as competent personnel and sufficient funds are available. Among the obstacles currently recognized are the shortage of professional personnel, the current unmet need for training facilities to be used for training lay inspectors, and the generally inadequate salary scale for activities of this type.

Regulatory officials must not fail to recognize that improperly enforced food control regulations provide a false sense of security to consumers and, in general, foster lack of respect for the programs which they conduct.

Because sanitation is a basic necessity in the

processing and handling of perishable foods such as poultry, part I—Sanitation, alone, may be adopted. Those jurisdictions which are able to provide the necessary funds and trained personnel to conduct antemortem and postmortem inspections may adopt both part I and part II. However, the ordinance is so worded that part II should never be adopted alone, but rather in conjunction with part I. Each part is further divided into an adoption-by-reference form and a complete form.

Since cost is a major factor, the adoption-by-reference form, being more convenient and less costly, is suggested for local adoption in areas where the adoption of ordinances by reference to published standards is considered legal.

The administrative reasons for the release of part I of the ordinance in advance of part II are:

1. Sanitation of poultry processing plants is basic to a poultry hygiene program and a prerequisite to effective poultry inspection. Providing part I of the ordinance to regulatory officials at an advance date will give them an opportunity to solve an immediate and pressing problem.

2. The time interval between the issuance of the two parts will provide public health and veterinary regulatory officials with an opportunity to study some of the complexities associated with carrying out antemortem and postmortem inspection in States and municipalities.

The poultry industry is aware that there are certain deficiencies in its operations, and it has made efforts to improve plant sanitation. The Institute of American Poultry Industries, a member organization of Associated Poultry and Egg Industries, has sponsored several schools for sanitation management and has prepared a manual which will be of assistance to progressive members of the industry. Also, the United States Department of Agriculture has, during the past 2 years, scheduled many sanitation institutes, on a sectional basis, throughout the United States. These have resulted in a renewed interest by poultry raisers in improving and maintaining plant sanitation.

There has been in the past, and will continue to be in the future, much discussion regarding the most feasible method for conducting poultry inspection. In an address to the 1950 Con-

vention of the American Veterinary Medical Association, Brigadier General W. O. Kester, Assistant for Veterinary Services, United States Air Force (5), outlined four points which are, generally speaking, the cardinal principles of inspection:

"An inspection agency, to be acceptable, must comply with the four cardinal prerequisites for an adequate inspection service. First, the inspectors must be competent and qualified. Second, they must have tenure of office, so that no one may put pressure on them in connection with their duties. Third, the inspectors' agency or supervisors must be responsible and accountable to the consumer. Fourth, the inspectors must have no financial interest or connection with anyone in the organization being inspected."

#### **Qualifications of Inspectors**

The qualifications for lay inspectors and their relationship to professional veterinary personnel have been discussed repeatedly during recent years. The proposed poultry ordinance does not attempt to set standards covering relative qualifications for employment. On matters such as this, the Public Health Service will be guided by the judgment of the organized associations of the veterinary profession and by outstanding public health authorities. At the moment, the policy statement of the American Veterinary Medical Association relative to the use of lay inspectors is basically sound. It states that lay persons should be authorized to sort the abnormal from the normal; the latter to be passed without restriction; the former to be left to the judgment of the veterinary inspector. No particular educational level is necessary, although common sense and good judgment are essential. Well organized, on-the-job training will be encouraged.

This policy is consistent with the belief of most veterinary public health authorities that many of the individual points of the inspection process can be undertaken by persons of limited training. To employ veterinarians on routine tasks, which can be performed ably by technical personnel of lesser qualifications, would be inconsistent with the concept that professional personnel should be utilized to the



maximum. The work of inspection must be downgraded so it can be performed by less highly trained personnel, while supervisory work should be reserved for the special knowledge and training of the veterinarian.

Through the adoption and enforcement of the proposed poultry ordinance by cities and States, consumers' health officers may assure themselves of an adequate level of sanitation in poultry processing plants and of safe, wholesome poultry and poultry products. Through its provisions they may authorize for sale in that community poultry and poultry products which are processed in other jurisdictions operating under this ordinance or its equivalent. The widespread adoption of this ordinance should provide a basis for the free interstate and intrastate movement of wholesome poultry and poultry products. It should provide standards of sanitation in poultry processing, storage, and sales, and inspection at a level consistent with public health requirements.

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## Dermatitis From Cadmium Plating

Dermatitis from cadmium plating is a well-known phenomenon. The dermatitis arising from this operation can be produced by any one of several substances used in the plating operation. In the first place, the metal, before plating, is often degreased with an organic solvent such as naphtha or gasoline and then scrubbed with sodium hydroxide, potassium hydroxide, sodium carbonate, potassium carbonate, or trisodium phosphate. The articles may then be pickled in strong acid solution, and even a bichromate solution may be added to the pickle. All of the above-named substances are dermatitis-producing agents by either their degreasing action or caustic properties. The cadmium

plating solution usually consists of cadmium or cadmium oxide, sodium cyanide, and sodium hydroxide. Sodium cyanide spray often causes dermatitis, mucous membrane irritation, and ulceration. Of course, the sodium hydroxide also may cause dermatitis and ulcers. It has been reported that when the skin comes in contact with the plating solution, it often turns black.

In addition to engineering devices for protection against systemic cadmium poisoning it is recommended that cadmium-plating workers use rubber gloves, impervious sleeves, and aprons to avoid skin contact with the solutions and petrolatum in the nostrils to lessen nasal mucous membrane irritation.





## The Practice of Public Health, 1953

**"D**OES THE WORLD CRISIS call for new and unusual responsibilities from the health team? Does it really demand spirit and ideals of service? If the answer is yes, and I believe there can be no other, we have the challenge of doing something more positive about many of our relationships. . . . Many leaders in education . . . have spoken of the gains of science, though of tremendous importance, as secondary to the world's real need—a fuller cultivation of those qualities which are best termed spiritual.

"President Eisenhower in his inaugural address . . . stated that his whole message rested on one truth: 'Whatever America hopes to bring to pass in the world must first come to pass in the heart of America.' "

WILTON L. HALVERSON, M.D., DR.P.H.  
*President, American Public Health Association,  
1951-52.  
Presidential address to the American  
Public Health Association at the  
Eighty-first annual meeting in New York City,  
November 11, 1953.*

a topical  
and selected  
report of the  
81st  
annual meeting  
of the  
AMERICAN  
PUBLIC  
HEALTH  
ASSOCIATION  
and related  
organizations  
held at  
New York City  
Nov. 9-13, 1953

*Reader's guide on page 142*

## The APHA Conference Report

This is *Public Health Reports* fourth effort—the first was in 1950—to summarize the scientific and technical discussions at the annual meetings of the American Public Health Association and related organizations. We consider it a privilege to give this service to our readers—many of them have expressed their satisfaction with our previous efforts—and to be able to carry on as urged by the Executive Board of the Association.

The earlier pattern of a news-type reporting of the highlights of many of the sessions has been followed in this presentation. We have attempted to give the essence of the papers, but by no means the complete story in each case. We have endeavored to reflect accurately the intent of each speaker although necessarily we have had to take editorial liberties in the interest of brevity and under the press of time. It must be clear, of course, that the author—not the Public Health Service—is the authority in each case for facts and opinions reported.

This is a selective report—in fact, considerably more selective than in years past. Time and staff limitations in 1953 forbade intensive followup for texts, and we relied solely upon the availability of texts through the press-room services of the American Public Health Association in New York before and during the annual meeting. In selecting the points of emphasis in individual papers, however, the editors had the cooperation of senior authors, who were asked to signify the points they considered of primary importance in their own papers. So far as possible, this evaluation has been followed in the summaries. Even though each report is, we feel, focused on the important points, the reading of our news-reviews cannot in any way substitute in concept or details for examination of the full papers when published.

This special section deals only with the scientific sessions. Association and section business and reports have not been reported, since this is a function of the official *Journal*. No full papers, of course, are published in this summary report. Complete texts of leading papers have already begun to appear in the *American Journal of Public Health*. Subsequently, others may appear in *Public Health Reports* and in appropriate specialty journals.

Our appreciation is extended to the many authors who helped us select the critical points in the papers—especially those who did so promptly—and to the officers and staff of the American Public Health Association for their cooperation and continued encouragement in the planning and execution of this project.

THE EDITORS

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# The Factors of Community Action In the Public Health Panorama

*Ranking high in significance in the practice of public health, community action—what it is and how it comes into being—was presented as a general topic of discussion before the first special session of the annual meeting. On the broad premise that public health is the product of community action, three discussants interpreted varying experiences in the light of how communities see their needs, react to these needs and then meet them. A fourth pointed to the community self-survey as one way to provide indispensable communication and, subsequently, bilateral participation. Nor was the topic confined to the one session. Repeatedly, it was stressed in papers presented in section meetings. Two of these, read before the health officers section, emphasized the team relationship of the community and its health officer, while a third, read before the medical care section, pointed to some community problems in hospital expansion programs.*

## Ties Success in Oregon To Community Activity

The history of two local health departments in Oregon, related by Harold M. Erickson, M.D., M.P.H., health officer of the Oregon State Board of Health, is the story of community action.

The Wasco-Sherman District Health Department, serving a population of 18,000, and the Jackson County Health Department, serving 60,000, illustrate the axiom that the development of sound public health services depends largely on the participation and support of the people served, Erickson indicated. Both health departments were originally sponsored by voluntary public health associations, he said.

### Step-by-Step Growth

Erickson traced the step-by-step growth of Wasco County health services from a citizens' association organized in 1926 to combat tuberculosis to district health department status in 1947 after the comprehen-

sive program of Wasco County was extended to Sherman County, and five public nurses were employed.

Each successive service added to the program had public backing, Erickson related. After the water supply of the county's largest city, The Dalles, was found to be contaminated, the city cooperated in adding a sanitarian to the health department staff, he said. Publicizing of the condition of the milk supply led to support for enforcement of the milk ordinance, pasteurization of the milk in fact as well as in name, and elimination of herds subject to abortion, he added.

In organizing services in various parts of the county, Erickson said that the health department learned by experience that citizens had to help organize and operate conferences or other programs if they were to be successful.

### No Children Arrived

He gave as an example the well-baby preschool clinic arranged by a public health nurse in a small rural

community. The nurse had seen the mayor and several prominent women in the community; the clinic was well publicized; the health officer and nurse, after an 85-mile trip, were in the building selected for the conference at the appointed hour, but no children arrived.

After that fruitless day, the women's club in the area was asked to sponsor the conference, Erickson said. The women were responsible for making appointments, for transporting parents, for keeping the conference rooms in order, and for supplying volunteer clerical assistance. The club accepted this assignment, he said, and during the first 3 months of operation every infant and preschool child in the area was seen at the conference.

When a question arose over the county's portion of the health department budget, Erickson said, these same women, and the women from the other areas in the county, the health association and service clubs and organizations that had worked with the health department, supported the budget. They stated that they had received more service from the health department "than from any other agency of county government," he commented.

### Comprehensive Services

The Jackson County Health Department, organized in 1925, was characterized similarly as a community product. The present staff consists of a full-time health officer, 9 public health nurses, 2 sanitarians, a laboratory technician, a health educator, and 2 secretaries, Erickson said. Plans are being made, working with a community group and particularly with the health association, to expand a child psychiatric service and to employ a full-time psychiatric social worker; the county has provided a \$2,500 budget for mosquito control, and the health association and health department are engaged in a community health needs survey, he added.

"In all three counties—Jackson, Wasco, and Sherman—it is obvious that when given leadership, direct or

'submerged,' and when offered the opportunity to take active part in planning and in carrying out the program, the people enthusiastically respond by providing good ideas; capable volunteer assistance; and the necessary finances for community health services," Erickson concluded.

### Group Attitudes Are Key In Community Reactions

How a community may react to its health needs in one or more of several ways was discussed by Earl Lomon Koos, Ph.D., professor of social welfare, School of Social Welfare, Florida State University, Tallahassee.

The community reacts positively or negatively, he said, in terms of its own special concepts of health; in terms of its value system; in terms of its level of communication and, therefore, of its members' participation; in direct ratio to the realism of the planning for health; and in proportion to provisions for private as well as public health agencies.

A community's public health activities "may be plotted somewhere on a continuum with a number of polar opposites, such as adequate facilities as against inadequate, knowledge as against ignorance, public interest as against indifference, adequate funds as against inadequate, acceptance of health needs as against rejection."

#### *Why These Reactions?*

"Public health activities may be viewed as efforts to move the individual's or group's attitudes and behavior farther along the continuum toward the positive end," Koos stated. "The real question facing the public health professions is not so much where the community is on this continuum as why it is where it is. Our concern must be with the factors which cause the community to react as it does."

The speaker pointed out that a community reacts to health standards in terms of its own ideas about

health, which may be quite different from those of professional health workers. The reasons for particular attitudes regarding health and illness are not always easy to define, he continued, but "each ethnic and racial group in the community has its special concerns and antagonism regarding health."

Little attention has been given to the importance of the "values system" of a community, Koos stated, but "the values system of a particular community or subcommunity must be known and its importance appreciated if we are to understand how that community reacts to its health needs." A new car or a television set may rank far above health as it is understood by public health workers, and yet these values have a "truly compulsive power in determining community or individual activities."

#### *Realistic Goals*

Participation in a community's activities is dependent on its level of communication, the speaker continued. For programs to be successful, the "natural groups" in the community must be determined and used. Indigenous leadership must be recognized and accepted by public health personnel and it must arise "out of a mutual recognition of human worth." Only under such leadership can public health programs be effective.

A realistic approach to the views of community members as to their health needs and to the ability of the community to support health services is necessary, too, Koos stated. "To set goals which are disproportionate to other needs and disproportionate to the community's ability [to support] is only to provoke irritation and discouragement for all concerned." Also, public health personnel must work in close cooperation with the personnel of other institutions, he added.

In conclusion, the speaker said that the community which supports private agencies in addition to public health agencies is providing "just that many contacts with health ac-

tivities for the divergent groups that make up the community."

### Social Scientist Can Aid Community Health Work

"The addition of the social scientist to the public health team is seriously to be considered as a very necessary augmentation of our resources," stated John D. Porterfield, M.D., director of health, Ohio Department of Health.

Believing that the community has much to gain by intercommunication between the health officer and the social scientist, Porterfield declared that the way in which the special competence of the social scientist is utilized is important in establishing the extent of its usefulness. An intensive 2-week visit of the social scientist to the community may or may not permit him to make a significant contribution, but "frequent consultation with the social scientist, the periodic discussion with him of the psychology and rationale of community action may give the health officer some amazingly vivid insights into the problems he has in purveying services to a public which has a mind of its own," he said.

#### *Basic Principles*

Porterfield listed three basic principles which, he said, "seem to underlie what the social scientist is trying to help us understand."

The establishment of communications is of the first importance, he maintained. "Unless there is an exchange of understanding between those who offer and those who receive, there is at best poor provision of services," he said. He felt that it is not enough to insure good channels: two-way contact must be established.

Participation must be a two-way proposition, he continued, with activity by the citizens of the community as well as by its officials.

And last, it is essential to develop a reasonably definite set of commu-



nity goals, considering not only specific objectives but also a realistic time schedule, he declared, adding that objectives must, of course, be flexible enough to permit citizens and professional specialists to take advantage of unanticipated gains and resources or to devote more time to a particularly difficult problem.

## *Implementation of Principles*

The Ohio director of health noted two mechanisms for implementing these principles: the community self-survey and the community health council.

The community self-survey "provides a means of communications and bilateral participation and leads to the development of an acceptable plan," he said. "It provides a link between the professional knowledge of need and the expression of citizen want—a link which can in time bring need and want to be nearly synonymous."

The community health council also provides an opportunity for combining professional knowledge with citizen interests, he pointed out.

There is an awakening to the need for the health team to be a consciously participating member in the human relationship of the community, Porterfield summarized, urging that the health team never forget its "silent partner, the citizen of the community."

## **Advocates Communitywide Self-Study and Remodeling**

A comprehensive approach to the entire complex of community functions rather than separate group action—the whole rather than the part—is advocated by Richard W. Poston, director of the department of community development, Southern Illinois University, Carbondale.

The bid for public support of professional goals has brought in its wake a myriad of community councils, Poston said. Instead of unifying the community, all of this activ-

ity tends to break it into segments, he declared. The community becomes an assorted collection of groups with one-track or no-track minds, and the term "community project" means actually a project of a special group or of one of the many councils devoted to the development of some particular compartment of the community corresponding to the objectives of the sponsoring professional group, Poston explained.

Public health is not only a product of community action, it is a product of the community itself, Poston stated. "The level of physical, mental, and social well-being of the people who make up the community is influenced by their economy, their schools, their churches, their civic organizations, their pattern of recreation—by their whole basic social structure," he said.

"The basic problem," Poston said, "is the need to somehow design, to mold, to create, and to build the kind of community that will produce in the process of living a higher standard of public health."

## *Program Demonstrated*

To demonstrate the application of the comprehensive community approach, Poston cited the 3-year experience of the University of Washington in helping 7 communities in the State of Washington develop this type of program. More than 80 communities in the State have now requested the program, Poston said. He outlined the following procedure:

First is the organization of a community self-study and action program, embracing the entire range of community life. A consultant from the University of Washington works with the community throughout the initial study, but the whole program is carried out entirely by local initiative. The university does not begin the work in any community without a clear invitation from the people who live there, he reported.

For 5 months the citizens hold a weekly old-fashioned American town meeting to discuss all community aspects, to discover and identify the causes of their problems, and to work

out their own solutions. Hundreds of people from all interests and all sectors of the community may take part. Everyone has an opportunity to express his opinions and recommend action in every area of community life. Research committees provide the facts needed for the discussions at each weekly town meeting. All groups, interests, organizations, and agencies are united in a single effort focused on the community as such. People who ordinarily do not participate in any community enterprise become actively involved.

"Out of the study comes unity and a common awareness of local needs," Poston said. "From this comes intelligent planning for community-wide effort in which the people can act together, not as organizations and specialized interests, but as citizens of the community in which they live. Under these conditions health problems tend to melt away because the community itself is becoming a healthier place in which to live."

## *Shoe Is on the Other Foot*

"Instead of the professional worker having to convince the community that his service is important before he can obtain the necessary facilities, he now finds the community demanding his services and providing the facilities," Poston said.

Poston gave as one example a community in which the publicly owned hospital was on the verge of bankruptcy. Factionalism had split the personnel; no one could give a clear accounting of hospital operating costs; one wing had been withdrawn from service, and month after month all efforts to reverse the situation ended in failure. The citizens—becoming concerned for the town's future—began to recognize that public apathy toward local needs, including the hospital, was in itself their most serious problem, Poston said.

Within 6 months, Poston related, the hospital was operating in a climate of community cooperation and support. Old conflicts vanished; modern business methods were established; nurses' salaries were

raised; employee morale was up; and the hospital was out of the red.

"The community development program is no panacea anymore than is any other program," Poston reminded. "But it does cultivate the unity of community life, and with unity comes a common interest in the solution of all local problems—health included," he concluded.

### Health Education Advances Community Organization

Effective community organization is a means of securing factual information, bringing about joint planning of programs and coordinating the services of individuals and institutions to meet all the health needs of the people, stated L. E. Burney, M.D., M.P.H., secretary and State health commissioner of the Indiana State Board of Health.

The potential benefits of working together toward a common goal are perhaps the greatest point of significance in community organization, the true objective of which is the establishment of an environment in which solutions to all problems may be developed, not the solution of a specific problem, Burney stated.

Good hospital programs and services depend on community organization, the speaker said. To meet responsibilities as heads of service institutions, hospital administrators need to know the approximate number of persons with conditions that will require hospital care. However, "until proper community organization can be effected, hospital people, as well as those of other service institutions, must find some means to obtain information on the potential needs of the people they serve in order to have a sound basis for planning their programs."

### Health Education Important

Health education programs are a major function of every successful health agency, the health officer continued, and the outstanding State health education programs include

the promotion and advancement of community organization.

Burney stressed the importance of health education in solving major health problems. He believes that "too many public health workers take too much for granted as to the essentiality and value of their services, and as to the public's awareness of the needs of these services. . . . People are not interested in health per se, but they are concerned when we demonstrate the benefits which accrue to them when certain procedures and services are inaugurated."

Burney pointedly questioned whether safe public water supplies, control of bovine tuberculosis, better-milk programs, and legislation prohibiting feeding uncooked garbage to swine came about because of economic necessity and competition or because of the public's desire for good health.

The speaker cautioned that public health will be competing for the public's acceptance with such fields as education, recreation, and planning "unless those of us in public health recognize it is not our job to teach people what to do but that it is our job to help them become the kind of people who will know what to do."

### Public Need Determines Hospital Expansion

The capital investment in a hospital affects professional policy for a generation, C. Rufus Rorem, Ph.D., executive director of the Hospital Council of Philadelphia, told the joint session of the medical care section and the American Association of Hospital Consultants.

An error in employment of personnel can be promptly adjusted, the speaker said, but an unnecessary building cannot lightly be dismissed. Therefore, he continued, "a community should view with alarm any expansion of hospital facilities except in response to a recognized immediate or future need."

Rorem pointed out that the original construction costs of a hospital

are inevitably followed by other expenditures equal to 10 to 20 times the capital investment. These expenditures, he said, are necessary to finance service during the life of the buildings and equipment.

### Appraisal Standards

Population data and highway mileage do not justify establishment of a new hospital, or even the expansion of bed facilities at an existing institution, Rorem asserted. Hospitals are instruments of public service rather than memorials to worthy citizens, and professional care is the primary objective, he declared.

Next to public need for a new hospital is utilization of the present and expanded facilities, Rorem said. The degree of physical depreciation or obsolescence of the existing plant must be determined before a decision is reached to abandon it for hospital services.

The proposed program should take into account the plans of all hospitals in the general area, provide for additional current expenses which may result from the new capital expenditures, and conform to modern trends in medical practice, Rorem said.

### Priority Principles

In addition to the appraisal standards, Rorem suggested that communities and hospitals consider four priority principles in making capital expenditures. Listed in order of priority are expenditures that (1) encourage or achieve coordination among hospitals; (2) increase utilization within hospitals; (3) extend the useful life of plant and equipment; and (4) increase bed capacity.

He pointed out that the expansion of bed facilities is not always the most pressing need of a community or hospital. "The quality of care in hospitals can rise no higher than the knowledge, skill, and devotion of the physicians who perform or direct the services," he said.

Since hospital capital has always been provided by the general public, Rorem concluded that hospital sponsors have a moral obligation to prove

that the public's investment will be wisely apportioned and effectively used.

### **Richmond Housing Plan A Community Success**

When health officials fail to provide the leadership and initiative in solving a local housing problem, all other health services are threatened, in the opinion of Edward M. Holmes, Jr., M.D., M.P.H., director, Richmond (Va.) Department of Public Health, and his associates, H. Clifford Mitchell, B.S.C.E., chief, bureau of sanitation, and John E. Pipes, M.P.H., supervisor, division of housing sanitation.

Richmond's housing sanitation program met with the approval and cooperation of the community because of the educational and democratic methods the city health department used in developing the program, they believed. The city council, at the request of the health officer through the city manager, authorized creation of a citizens' committee to investigate housing and submit appropriate reports, they said.

#### *Public Representation*

The members of the citizens' committee represented the business, industrial, and educational life of the community, assuring thorough scrutiny of every aspect of the city's housing problem. Special efforts were made to include representatives of the owners of marginal and blighted property on the committee, Holmes and his associates stated.

This democratic team concept is basic to a housing program's success, they asserted. Points of disagreement are certain to arise between the official agency and those who might oppose the program, and it is better to "haggle" in committee meetings than in the courtroom during the enforcement phase of the program, they commented. Appropriate suggestions from individuals and groups likely to be most af-

ected by the program were recorded in the committee's recommendations, they added.

The committee's final report recommended adoption of a housing code similar to that of Baltimore and the establishment of responsibility for an enforcement program in the health department, they said. The drafting of the housing sanitation ordinance was performed by a city council subcommittee, the health officer, the city attorney, and a member of the citizens' committee, they related.

#### *Public Presentation*

The minimum requirements of the draft were presented to the community. This gave Richmond a better understanding of the program objectives and made it possible to incorporate their interests and desires into the framework of the final ordinance, they explained. The proposed ordinance was discussed before trades councils, various clubs, the parent teacher association, and business groups, they stated.

A delegation from every community organization to which the program had been presented appeared at the public hearing held by the city council and the ordinance was passed unanimously as recommended, they commented.

The health department's bureau of sanitation avoided a conflict with the planned activities of other city agencies by direct consultation in developing its rehabilitation program, they said.

#### *Public Action*

A specific site to launch the rehabilitation effort was selected with the aid of the appraisal technique outlined by the APHA Committee on the Hygiene of Housing, they reported. An area in which rehabilitation could be accomplished in a relatively short time was chosen to stimulate further public interest, they commented. Tenants and homeowners were contacted personally, and the program was thoroughly explained, they said. The problems

of the area were discussed openly and cooperatively at subsequent block meetings with owners and tenants, they related.

They also stressed that improved training opportunities in the technical aspects of housing evaluation and program planning are needed.

### **Detroit Mental Health Accents Prevention**

Since present treatment facilities are not preventing the spread of mental illness, Detroit is supporting a preventive program for mental health rather than expending the health department's treatment facilities.

The story of the evolution of Detroit's mental health program was told to the health officers, maternal and child health, public health education, and public health nursing sections of the APHA, and the American School Health Association by Benjamin Jeffries, M.D., mental health psychiatrist consultant, and Mary Burke, R.N., M.A., mental health nurse consultant, of the Detroit Department of Health.

Detroit's program is based upon the concept that a mental health division of a city health department "should operate in a consulting and coordinating capacity," and that it should initiate and direct mental health projects with other divisions, they said.

Among the projects described by Jeffries and Burke were an orientation course in basic personality development for new supervising nurses, health center conferences, child growth and development workshops, workshops for nursing supervisors and consultants, and health education and social hygiene projects.

Mental hygiene has been a part of the staff education of public health nurses in Detroit since 1916, and most nurses who have joined the staff have had a conference with a psychiatrist as a part of their examination for employment, they noted.



### Community Cooperation

Jeffries and Burke reported that they were "astonished and delighted" that experts in the community, as well as community groups such as universities, State health authorities, private agencies, and industrial groups, were available and willing to help in these projects. It is important that such resources be utilized both in planning and in promoting mental health programs, they said.

The mental health division is now participating in a program at a Detroit hospital "to control emotional illness and improve the mental health" of the patients, they reported. Mental health education seminars for all hospital staff members, ward conferences, and research and evaluation of the entire project, including the attitudes of patients and personnel, are parts of the program.

Although progress of the mental health program in Detroit has been slow because of difficulties in obtaining acceptance of the intangibles of such a program, the records indicate that nurses are becoming more sensitive to emotional factors in their work with families, Jeffries and Burke concluded.

### Intercommunity Progress Cited by Nashoba

Independent towns can work together when the cause is universal and when both lay and professional leaders exercise sound and diplomatic guidance, Kenneth I. E. Macleod, M.B., Ch.B., M.P.H., declared, in reporting on the 23-year record of the Nashoba Associated Boards of Health (Ayer, Mass.), of which he is medical director. Each of the 14 towns represented sends 3 men to the Nashoba Associated Board.

Between quarterly meetings, members of individual boards of health are fully informed regarding what is being done and why it is being done, Macleod said. As they repre-

sent local authority, their understanding of the operation and financing of Nashoba is of vital importance.

Financed as a demonstration by the Commonwealth Fund from 1930 to 1935, Nashoba programs today are paid for by a tax assessment, with some State aid, Macleod continued. Two new programs—dental health (only two of the towns have resident dentists) and mental health consul-

tation service—have recently been added to the sanitation program, preventive medical and nursing services, public health laboratory service, and medical social service.

Macleod said that he had no fears for the future of Nashoba, that it has "an understanding and appreciative public who will support good public health work and who will cooperate in maintaining it."

## Classroom Trends, Field Training In Dental Public Health

*Critical review and appraisal of the curriculum content of the courses in dental public health and preventive dentistry keynoted one of the two major sessions of the dental public health section. From the University of Michigan came a report of a survey made to ascertain the current pattern of classroom content as well as a listing of areas of improvement, while another speaker noted the shift in teaching emphasis to preventive measures. Still another reviewed the content of courses being offered in schools of dental hygiene. In the other session, an informative account of how Kentucky dental students are finding experience in the field invaluable, was presented. Finally, the contribution made by dental personnel in the Veterans Administration Hospital at Tuskegee, Ala., in sponsoring an areawide rural health institute was acclaimed.*

### Kentucky Dental Students Get Basic Training

Underprivileged and dentally inexperienced children who came from neighboring hills and mountains in search of dental treatment provided invaluable experience for dental students participating in a Kentucky public dental health pilot program.

Conducted in remote Kentucky areas, a topical fluoride service and corrective program was carried out with use of dental students before they started their senior year.

The children came 8 or 10 miles,

J. R. Robinson, D.D.S., director of dental health for the Louisville-Jefferson County Board of Health, related in assessing the accomplishments of the program. Some walked, he said, and others came by mule, wagon, or truck. Although there was no cost in dollars and cents to these children, they frequently paid a price of great inconvenience.

### Remote Areas Benefit

Regardless of the cost, Robinson stated, the program indicated to the students the need and demand for dental care, and "if it causes one or two young men—and it has—to begin



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practice in areas considered not too desirable, then the effort and the cost were not in vain."

Robinson, who is also associate professor of preventive medicine and public health at the University of Louisville School of Dentistry, traced the origin of Louisville's dental public health program to 1946 when two 3-chair dental clinics were established at community health centers. Instructors at the dental school supervised senior students who took on rotating assignments. The program began to operate in full force in 1949 when a division of dental health was created in the Louisville health department.

### *Public Health Practice*

Freshmen students, Robinson said, take a 1-hour lecture course on oral conditions associated with communicable diseases. The lectures, which are given by staff members of the Louisville health department and instructors in community health from the University School of Medicine, serve as a fundamental background for the study of pathology, bacteriology, and related areas of instruction. In their junior year, students enter the health department clinics, and at that time are given review courses in the fundamentals of public health. As seniors, they receive instruction in preventive dentistry and public health dentistry.

Senior students engage in public health practice at the clinics, and also spend a day each week treating children at a crippled children's hospital. They learn to handle children of all elementary grades under conditions similar to those of the private dental office, and they attempt to carry the same children through all appointments to completion of treatment. Routine procedures in the program include amalgam, silicate, and cement fillings; extraction of both temporary and permanent teeth; X-rays; prophylaxes; pulp extomies; stainless steel crowns; and treatment of abscessed teeth and periodontal conditions.

Senior dental students in 1952-53, Robinson said, cared for 332 children

for an average of 3.6 appointments per child. Service costs were \$2.12 per patient visit, and \$1.51 per operation performed.

Aimed primarily toward the care and dental education of the school child, the program is designed "to get as many children as possible into the dental office for treatment and to stimulate the dental practitioner to become interested, or to reinterest himself, in the proper management of the child patient," Robinson said.

### **Urges More Health Content In Hygienists' Courses**

The curriculum content of courses in dental public health and preventive dentistry offered by schools of dental hygiene was reviewed from the standpoint of unified standards by Margaret Ellen Swanson, B.S., executive secretary of the American Dental Hygienists' Association, Washington, D. C.

"The entire field of practice of the dental hygienist can be considered the basic preventive measure in the dental health of the public," she said.

The Council on Dental Education of the American Dental Association in June 1951 issued the following declaration of the objectives of the course in dental hygiene, Swanson reported:

"The prime function of the dental hygienist is to assist the members of the dental profession in providing oral health care to the public. She may apply her knowledge and skills either in the office of the private practitioner, or in formal health educational activities in schools or other agencies. In either instance, she can and should perform an important function in health education. . . .

"The present 2-year course seems adequate to prepare the dental hygienist to perform tasks that may be assigned to her in the private dental office, but when employed by a school system or any other agency, her dental hygiene education should serve as a foundation for further study, or as a supplement to previ-

ous study to prepare her to assume such responsibilities. Her education should develop a sense of professional responsibility and an understanding of her relationship to the broad field of health as well as a capacity for growth and advancement."

This agreement was reached at a conference for directors of dental hygiene, Swanson said. Numerous conferences have been held in recent years by the administrators of dental hygiene schools for the discussion of similar problems pertinent to all schools.

### *Curriculum Scope*

At the 1951 conference, Swanson said, it was felt that a course in public health for the dental hygienist should probably give the student a knowledge of the history and development of public health, and, among other phases, a knowledge of the principles of general health practice and the relation of the dental hygienist to the field. The same group, she reported, also recommended that 24 hours should be the recommended minimum requirement for the subject of public health within the dental hygiene course, but that if the student is to be trained for a position in public health education, additional training should be required in health education beyond the 2-year course.

"The Council on Dental Education has recommended that the course in dental health education be a minimum of 32 hours, which includes methods and materials used in teaching dental health in schools, in public health institutions, in industry, and in dental practice; uses of statistical, visual and auditory aids, records and reports; and followup procedures," Swanson reported.

### *Postgraduate Work*

In the requirements for the accrediting of a school for dental hygienists, which the Council on Dental Education issued in 1947, according to Swanson, public health was included as an area of instruc-

tion with the suggestion by the Council that it be "a survey of the theory of preventive dentistry and public health, with emphasis upon the principles and problems of community dental health."

"Consideration should be given by the various dental hygiene schools to the establishment of either postgraduate or refresher courses for dental hygienists interested in public health service," Swanson urged. For a girl going into an active public health program, it is found that additional work is needed beyond the instruction in this subject in the 2-year dental hygiene program. To my knowledge, there are only 2 schools which have such postgraduate courses."

### Teaching Trends Accent Prevention Concepts

"The basic purpose of dental public health could be considered the ultimate aim and objective of the undergraduate dental school program," stated Shailer Peterson, Ph.D., secretary of the Council on Dental Education, American Dental Association, Chicago.

"Dentistry must serve its obligation to the public, and dental education finds that its graduates can best accomplish their function to the public by the proper utilization of their own skills in their own offices, by the effective use of auxiliary personnel, and by utilizing group education and group planning methods to convey messages of health care and preventive dentistry to the public," he added.

Discussing changes and trends taking place in the dental curriculum, Peterson mentioned that although opinion differs as to the meaning of dental public health and preventive dentistry, all dental school administrators agree that the courses offered under either title have grown tremendously in the last 10 or 15 years. He based his conclusions on a short survey he recently made of dental schools.

### Integrated Curriculum

"Preventive dentistry and dental public health can no longer be identified as individual courses in an undergraduate dental school program," he said. "They have now become concepts that are essentially synonymous with the primary goals of dental education."

The importance attributed to public health concepts is clearly indicated, Peterson believes, by the fact that instructors in many subjects are interweaving these concepts. "When a concept is felt to be so important that its contents cannot be handled adequately with the mere addition of a new course or the expansion of the one or two already with such a title, it is clearly a sign that the concept itself has become an integral part of the entire field of study," he asserted.

"The development of dental public health as a specialty was a natural outgrowth of the development in the field of dentistry," Peterson said. "With the changing trends bringing with them a shift from emphasis on restorative and clinical work to an emphasis on preventive methods, it is natural that a group should wish to provide itself with a special knowledge and experience necessary to promote and expedite these new objectives."

This group of specialists now has its nationally recognized board, the American Board of Dental Public Health, and its requirements have been approved by the Council on Dental Education and the House of Delegates of the American Dental Association, he continued.

### Increasing Attention

About one-half of the schools report that attention to the concepts of dental public health and preventive dentistry has at least tripled during the last 10 years; every one of the schools expects to increase the amount of time and attention to this field during the next 5 years, Peterson reported.

Nearly all of the schools surveyed offer specific courses entitled "public

health," but they all report a wide selection of courses in which their faculties include the concepts of public health dentistry. Pedodontics, orthodontics, periodontia, and pathology were the courses most frequently mentioned for providing these concepts in the undergraduate curriculum, he said.

Public health is not being taught merely from the theory standpoint, Peterson said, although the amount of didactic work has increased. "Probably most of the increase in this area has come in the field work, or in the clinical aspect of public health dentistry," he said.

All of the schools feel, he added, that instruction in public health and preventive dentistry are "equally or more important for the dental hygienist than her training in dental prophylaxis."

### Room for Improvement In Basic Courses

There is considerable opportunity for improving the curriculum content of courses of dental public health and preventive dentistry in schools of public health to prepare the public health dentist for his specialized needs in certain public health areas, according to Kenneth A. Easlick, D.D.S., professor of public health dentistry, University of Michigan School of Public Health.

The educational areas in which these improvements could be made, he said, are in basic science, review and critical appraisal of scientific dental research, oral diagnosis, preventive or control techniques in dentistry, treatment of the oral conditions of children, treatment of periodontal disease and of handicapped persons, and the use of dental health indexes.

"Certainly," he added, "the dentists, coming to schools of public health, as they do, from a variety of backgrounds and after varying lengths of time since graduation from a dental school, cannot be presumed to be graduated with a master's degree in public health as critical sci-

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entific consultants in public health dentistry unless they are exposed to informed dentists and an excellent dental library during their year as students of public health."

### *12 Years Later*

Dr. Ira V. Hiscock in 1941 raised some questions which, Easlick said, can be repeated profitably in 1953 with some geographic exceptions and limitations. These were, according to Easlick: Can advance in the sciences be translated into further social benefits, through the prevention, control, and treatment of oral disease? Will professional groups adjust to their responsibilities and grow in usefulness for social good?

Since the adequacy of the present curriculum for the public health dentist will depend on the activities for which he is being educated, the Michigan professor said, perhaps serious evaluation is needed for the 11 specialized tasks incident to State dental health programs which have been recommended by the APHA Committee on Professional Education (in *American Journal of Public Health*, February 1952, pp. 188-191).

The committee's recommendations indicate, the professor continued, two distinct phases of professional specialization for which the public health dentist requires education and experience—in the general principles and practices of public health so that he may assume his appropriate place as a member of a team of specialists that promotes health for the public—and in those sciences and disciplines which prepare him, when a student, to assume the adequate practice of dental public health.

### *What the Schools Offer*

Summarizing the findings of a survey designed to determine the pattern of subject matter to which dentists currently are being exposed when they enroll in one of 11 accredited schools of public health, Easlick said:

Three schools employ a staff dentist (1 full-time and 2 half-time). Two utilize dentists from schools of

dentistry. Two provide lectures from State dental directors or regional consultants of the Public Health Service. Four utilize no dentist whatsoever.

Seven schools provide a special adviser for the dentist; 4 do not. In 6 schools, the special adviser is the person designated to assist in specialized instruction in dental public health.

In 10 schools, the dentist becomes a candidate for the master's degree in public health, and in 1 for the diploma in dental public health. In 2 schools, he also may become a candidate for the master of science degree, in 2 for the doctorate in philosophy, and in 3 for the doctorate in public health.

A total of 67 master's degrees, or diplomas, in dental public health has been granted to dentists during the past 5 years; 51 of these by 3 of the 11 schools.

Five schools list a seminar in dental public health taught by dentists, but 3 schools list no dental courses. Three list special studies. In 1, these are dental public health survey, advanced topics in dental public health, bacteriology of dental caries, seminar in dentistry for children, seminar in growth and developmental problems, and a dental problem; all are supervised by dentists.

One school lists additional electives in specialized graduate dental courses. Two schools list postgraduate courses in a school of dentistry. Eight list no specialized electives.

### **VA Dentists Sponsor Rural Health Institute**

"Professional insularity has no place in today's world," asserted Clifton O. Dummett, D.D.S., M.P.H., chief of the Dental Service, Veterans Administration Hospital, Tuskegee, Ala., and editor of the *Bulletin of the National Dental Association*.

"Dentistry, like medicine or any other profession, cannot stand alone," Dummett maintained. "It

must work with the other professions, and all must work with the people for the achievement of health." Public health offers one of the best opportunities for interprofessional cooperation, he said.

### *Awareness, An Objective*

Dummett said, however, that the initiative in handling public health problems must be taken by the groups aware of the problems and capable of doing something about them. In Tuskegee, he reported, the Dental Service of the Veterans Administration Hospital sponsored and conducted a 4-day institute of public health in 1952. Cooperating groups included State and local official agencies, professional organizations, and educational institutions.

Such institutes, Dummett concluded, serve to sensitize individuals to the presence of community needs, disparities, and inequalities and to point out the role of health in helping to solve many of the problems which create tensions, encourage separatisms, and perpetuate weaknesses. Awareness of the problems is the first step towards amicable resolution of these conflicts, he added.

### *Accomplishments Noted*

Listed as specific accomplishments of the Tuskegee meeting were: crystallization of vague opinions concerning public health; increased appreciation of the role played by dentistry in public health; greater recognition of the importance of the role of social scientists in public health; better regional interracial understanding; manifestations of local interest in fluoridation of water supplies; and stimulation of interest in holding similar meetings in the future.

In the south, particularly the rural south, Dummett pointed out, there is an insistent need for the application of the fundamental principles of public health. Illness, deficiencies, and lack of opportunity affect adversely the utilization of human skills, he said. Hence, the



development, utilization, and conservation of natural technological capital and human resources must be fostered and extended if a prospering people is to evolve in this area.

With emphasis on public health, the institute brought together the current scientific knowledge in the subdivisions of public health and related it to the health needs in the

rural areas. Although sponsorship of such an institute by the dental profession is uncommon, it is no more remarkable than sponsorship by any of the other disciplines represented in the American Public Health Association, Dummett said in concluding that the recognition of need is the logical predecessor to the initiation of a program.

Connecticut agency has cooperated in joint operations wherever possible, Shindell said. It has guided the programs of others when appropriate, and it has augmented and supported financially the efforts of some. New facilities, he stated, have been established only when there were none to serve as a nucleus and then only to provide a service which was not available elsewhere and which was clearly in the public interest.

### *Equitable Balance*

Shindell named three safeguards that have been set up to insure an adequate service to patients who become the responsibility of the State and to keep governmental activity in an equitable balance with private effort.

First, he said, in addition to State officials, five citizens are appointed to commission membership by the governor. Second, all the medical facilities have advisory committees made up of private practitioners who guide medical policy. Third, no patient is considered for admission to any State rehabilitation service unless he is recommended by his personal physician.

Persons receiving inpatient service are charged whatever portion of the cost they are able to pay, Shindell added. These funds are returned to the general fund of the State and are not used in any specific institution. Thus, he pointed out, the State facilities are not compelled to compete for private cases in order to remain solvent.

Shindell cited the grant-in-aid program as an example of the commission's emphasis on supporting local efforts for the care of chronically ill patients. The commission, he said, has participated in a training program for the operators and personnel of private, chronic, and convalescent hospitals so that their standards of care can be raised.

When it was apparent that a facility was needed which could give long-term, definitive medical care above and beyond the care the usual convalescent home can provide, he

## Unifying Rehabilitation Areas, A Health Department Task

*The components of a rehabilitation services program for the chronically ill and chronically disabled were discussed before the medical care section. In one paper, the need for achieving public understanding of the scope and benefits of the problem was emphasized while in another Connecticut's "preventive welfare" program was explained.*

### Connecticut Program Aids Chronically Ill

Connecticut has added to its traditional health and welfare activities a statewide program of rehabilitation services for the chronically ill.

Terming the program "preventive welfare," Sidney Shindell, M.D., medical director of the Connecticut Commission on the Care and Treatment of the Chronically Ill, Aged, and Infirm, attributed its formation to economy in welfare expenditures and the increasing number of older patients being committed to the State mental hospitals.

If a wage earner has ceased to be self-sufficient because of illness or disability, remedial services may keep him from remaining a welfare charge, Shindell explained. He said also that placing senile patients in mental institutions interfered with the prime function of mental hospitals by overcrowding them. Special services for patients who are merely old might return them to their

own homes in better condition, he observed.

### *An Economy Measure*

Connecticut found that rehabilitation services can save more than half the expenditures required for simply supporting a patient, Shindell said. Recognizing its obligation to support welfare patients, the State also recognized its obligation to use every possible economy in doing so, both in terms of dollars spent and in human potential. All of the services needed could not be purchased from individual practitioners or private sources, he stated. Hence, the commission on chronic illness was created to help develop existing resources and supplement them with special facilities as needed.

The commission, mindful of the limited role of government, has attempted maximum use of existing private resources, Shindell said. It has tried to avoid duplicating or competing with services offered on a private basis, he declared.

In its rehabilitation work, the



## REHABILITATION GOALS

stated that the commission contributed to the development and expansion of a private institution, rather than assume that function as a tax-supported agency.

Shindell explained that Connecticut is in a fortunate position in terms of its ability to establish a statewide rehabilitation program. It is small in area, he said, relatively wealthy, and highly industrialized, but with light industry for the most part. There is no disproportionate urban-rural distribution of population, and Connecticut has few major health problems unsolved, he said.

### Public Support Requisite For Rehabilitation Work

Rehabilitation services are not being developed as rapidly as they should be because most persons responsible for the care and support of chronically disabled persons have only a vague notion of what these services are and what they can do, according to Morton L. Levin, M.D., Dr.P.H., assistant commissioner for medical services of the New York State Department of Health.

Levin pointed out the need for reaching the public and the profession through an information program. Community support for rehabilitation services must be gained, and the support of many different official and voluntary health and welfare agencies must be mobilized and their services integrated in the rehabilitation process, he declared.

### Public Health Function

Education, recruiting of community support, and integration of the services of community agencies are all public health functions and responsibilities, Levin said. He also pointed out that ordinary forces of medical demand are not sufficient to supply the needed service and that the persons most in need of rehabilitation are the least able to pay for it.

For these reasons, Levin believes that a logical unifying agency for establishing rehabilitation services

in a community is the health department and the health officer is the logical person for the job.

Disabled persons receiving public assistance present the most evident and pressing need for rehabilitation, Levin said. He gave as an example of one step in this direction the systematic appraisal of public assistance recipients being made by the New York State Department of Social Welfare. The disabled persons receiving aid are being classified into those who do or do not present some hope of rehabilitation. But the rehabilitation work itself will depend on availability of the facilities, he said.

"It is probable that some form of initial subsidy will be required to enable hospitals to make necessary physical alterations and install equipment for rehabilitation wards, to assure sufficient income from patients, and to provide some way of meeting the deficit which rehabilitation hospital facilities usually incur," Levin said. "These funds," he added, "need not necessarily come from tax sources; there are many voluntary health agencies with funds available for rehabilitating persons with specific diseases, which, if pooled, could help support a communitywide rehabilitation service."

### Need is Evident

Levin said that although the precise extent of unmet needs in rehabilitation is not known, an estimated 2 million persons have disabilities requiring rehabilitation services to make them employable, and each year an estimated 250,000 persons of working age become in need of vocational rehabilitation through disease or accident.

Studies such as the two the Commission on Chronic Illness is making of representative samples of the chronically ill and disabled population in Hunterdon County, N. J., and in Baltimore will be a useful index of the quantitative aspects of needed rehabilitation facilities, Levin said.

However, he said, no extensive survey is required to demonstrate the need for some such facilities in

many communities. A visit to any nursing home, county home, the infirmary of a home for the aged, or to families receiving public assistance will indicate the number of rehabilitation prospects.

Where rehabilitation facilities have been set up, patients who can be helped invariably have appeared, Levin said. Why, then, he asks, are we so slow in creating facilities?

### Return to Active Living Is Rehabilitation Goal

The change in emphasis from the treatment of a disease or injury to the treatment of the "person" with the disease or injury is reflected in medical education and practice throughout the country, according to Hart E. Van Riper, M.D., medical director of the National Foundation for Infantile Paralysis.

This concept of complete care, Van Riper indicated, means saving the patient's life, preventing deformity, developing his remaining capacity for functional activity, and returning him to his home prepared to take an active part in community life.

Like the National Foundation for Infantile Paralysis, many voluntary agencies in the health field today are centering their interest around the problem of rehabilitating persons who are handicapped by a disease or type of injury, Van Riper observed.

### Broad Approach

"Whether the handicap is a result of hereditary factors, congenital defect, or subsequent disease, injury, or environment does not alter the fundamental pattern of attacking the problem," he said. "In every instance there is need for research and teaching in the areas of cause, prevention, after-effects, and treatment."

In describing its triple program of research, medical care, and education, Van Riper stressed his agency's contributions in personnel training and professional education.

"As an agency which has assumed

responsibility for an attack on a specific disease, it also has considered it necessary to assume a responsibility to add to the total pool of qualified personnel on which it must depend to undertake research and teaching," he said.

#### *Sponsors Trainees*

"Since 1938," he said, "3,425 persons have received scholarships and fellowship awards of from 6 months to 4 years for preparation in predoctoral and postdoctoral research, specialty or postspecialty training in selected medical or surgical fields, and basic preparation for entering medical auxiliary fields, such as physical therapy and medical social work."

The award recipients, Van Riper explained, are not obligated to accept employment in poliomyelitis research or in clinical programs caring for poliomyelitis patients. Their only obligation is the declared intention to work in the field in which they are trained.

A study of a group has shown, he said, that only a few have accepted employment in situations unrelated to the care of poliomyelitis patients, and many have responded to calls for service in epidemic areas.

To further alleviate the problem of personnel shortages, financial assistance has been given to a number of professional schools to improve and enlarge their educational programs and in some instances to establish new programs, Van Riper stated. Professional associations have been given assistance in enlarging programs to meet the changing demands of patient care services, and support has been given to a number of medical schools in the teaching of the concept and basic techniques of rehabilitation as a part of basic medical education.

The experience of the National Foundation in the rehabilitation of poliomyelitis patients, he explained, shows that at least 75 percent of the patients who require assistive services must be cared for in their own communities without benefit of rehabilitation centers.

## Techniques of Measurement And Morbidity Surveys

*Broad application of statistical methods of measurement in the field of public health, particularly in measuring morbidity experiences of large population groups, focused the attention of the statistics section and the Biometrics Society on a discussion of techniques applied in Michigan, California, and Canadian studies. The advantages and disadvantages of the interviewing technique, relying on the memory of the respondent, and the diary record kept by the household-respondent, were described. In still another session in which the statistics section was joined by members of the food and nutrition and maternal and child health sections as well as the American School Health Association, data on the reliability of the interview technique in measuring protein intake of children were presented by two Harvard researchers.*

### Studies Morbidity Experience Of Canadian Plan Members

Determination of the relationships between illness existing in the population and illness treated by physicians is a problem of general interest to preventive medicine quite apart from its implications for medical economics.

This statement was made by John R. Smiley, Carol W. Buck, M.D., Dr.P.H., and G. Edgar Hobbs, M.D., M.P.H., of the department of psychiatry and preventive medicine, University of Western Ontario, London, Ontario, Canada, and Odin W. Anderson, Ph.D., of the Health Information Foundation, New York City, in reporting their results of a study of the morbidity experience of subscribers to Windsor Medical Services, a voluntary prepaid health insurance plan, initiated and operated by physicians in Windsor, Ontario.

Illness rates decline fairly sharply from infancy to adolescence, with slightly higher rates for males, after which the rates increase with age, particularly for females. Except for the age at which the minimum rate occurs, this trend was

shown in the three studies with which the Windsor rates were compared, they said, and "on the whole . . . it appears that a characteristic age and sex pattern of morbidity emerges, regardless of differences in method of measurement, if the period of observation is sufficiently long and the definition of illness a broad one."

### *Changes Related to Age*

Three basic changes in illness rates related to age were noted by Smiley and his associates: diseases which rise in incidence with age; those which fall with age; and those with high rates in infancy and in late adult life. However, they continued, accidents and two groups of diseases follow none of these age patterns. Accident rates reach a peak in childhood and decrease moderately thereafter; rates for diseases of the genitourinary system in females rise until middle life and then fall; and rates for nervous and sensory diseases show little or no change with age.

For certain groups of diseases, the study showed rates for females with a marked increase over those for males; for other groups, namely,

## HOUSEHOLD SURVEYS

nervous and sensory and circulatory diseases, there was only moderate excess, they said. Minimal or inconsistent sex differences were noted for infective, respiratory, skin, digestive, and bone diseases. Except for bone diseases, this is the same group for which rates fell with age; also, they include mainly acute illnesses. Perhaps, the study team observed, this lack of sex differences is more than coincidental.

Seasonal differences did not disturb the characteristic age trends and sex differences revealed by the study. However, the increase in allergic and endocrine diseases among females, accidents among children, and skin diseases among male children "may represent a true seasonal change in prevalence related to the summer environment and vacation pursuits," they concluded.

### Diary Records Tested In Illness Survey

A diary record of illness kept by a household respondent yields higher illness rates in a household-sample survey than the interview method, but the additional information pertains largely to minor illness.

This finding was reported by George I. Allen, B.A., survey statistician, Lester Breslow, M.D., chief of the bureau of chronic diseases, and Arthur Weissman, J.D., formerly supervisor of the morbidity research project, California State Department of Public Health, and Harold Nisselson, Ph.D., chief of the field methods division, U. S. Bureau of the Census.

The comparative study of diary and interview methods reported by the researchers was made in 1952 in the San Jose area as part of the California morbidity research project set up to develop a feasible method of morbidity measurement for use on a current statewide basis. Memory losses and the respondent's lack of knowledge about illness of other household members have been considered sources of significant biases,

the investigators pointed out. A day-by-day record of illness kept by a household member has been proposed to obviate such bias, they said.

### Data Yield Compared

Contrast of the incidence and prevalence rates of illness gathered from diary records in the San Jose test with rates collected by interviewing comparable samples of households for the same time periods provide information on the relative effect of the memory and knowledge biases and on the type and amount of assistance that must be given diary-keepers, they indicated.

Main findings of the study follow:

The diary-keepers reported higher rates of illness for a calendar month than persons interviewed, but the rates for medically attended illness were close for both groups. There was less difference between rates for disabling illness than for nondisabling illness.

The difference between diary rates and interview rates was about the same for men, women, preschool children, school children, and adults under 65 years of age. For older persons, a group of special interest to many workers, diary rates were much closer to interview rates than for other groups.

For disabling illness, classified by degree of severity such as hospitalization or confinement in bed at home, the diary rates were identical to interview rates for more severe illness, the rates diverging as the severity of illness lessened.

In the broad cause groups of illness the ratios of the diary rates to the corresponding interview rates were highest for minor illnesses.

### Diary More Expensive

The investigators pointed out that the diary method of obtaining illness data is relatively expensive. Households in the sample must be visited to place the diary and to insure comprehension of instructions, thus expense of placing the diary may approximate the cost of obtaining a fairly comprehensive interview, they explained. Cost of assisting re-

spondents in diary maintenance must be included, and, finally, if nonresponse is to be held to tolerable limits, a proportion of the available funds must be used to obtain the return of the diary, they observed.

Entries in the diaries, the investigators found, were more difficult to edit and code than interview entries. Difficulties ranged from illegibility of the respondent's entries through failure to include sufficient information for adequate classification. For example, they said, 17 percent of the causes of illness reported in the diary were codable only as symptoms or ill-defined conditions, the ratio for the interview being 5 percent.

The investigators concluded that the additional information gained on minor illnesses in a diary are of special interest when they can be identified through followup as early manifestations of serious conditions, but that this identification is not possible in a short-term, general purpose morbidity survey. The additional reporting of other illness obtained by diaries may be insufficient to justify major additional expense in surveys designed primarily to obtain information of current operational interest, they said.

### Uses "Symptoms Approach" In Health Needs Study

The background, development, and application of the "symptoms approach," a method used by Michigan in studying its "unmet health needs," was described at a joint meeting with the Biometrics Society by Edgar A. Schuler, Ph.D., professor and chairman, department of sociology and anthropology, Wayne University. Schuler gave a brief history of the Michigan health survey.

One of several problems posed by the symptoms approach, he said, is the length of observation or reporting period—in Michigan, the 6 months preceding the health interview—which is further complicated



"by the fact that a person's actual health status may and sometimes does change between the time an interview is taken and the time a subsequent validation examination can be given."

### *The Michigan Study*

In 1948, Schuler reported the Michigan State College and the Michigan State Medical Society began a research project in the field of health and medical services based on a random sample representative of the people of Michigan with the exception of Wayne County, which contains Detroit and about 40 percent of the State's population.

The project grew out of the interests of Michigan physicians and State college sociologists in obtaining unbiased current information regarding medical needs, utilization of medical services, and attitudes and opinions on issues and problems in medical practice and the recognized need for obtaining continuing information along those lines, Schuler continued.

Schuler explained his idea of the nature of unmet health needs. He characterized the symptoms approach as one method of approaching the objective of measuring unmet health needs, but one which merits further research and refinement.

### *The Approach*

In the symptoms approach, standard stimulus questions relating to pathological conditions and starting with "Is any member of your family now suffering from any of the following symptoms—?" are asked by nonmedical interviewers of lay respondents so as to yield data from which a physician can determine whether medical care is needed, Schuler said. The questions are not intended to yield diagnoses, he emphasized.

"Initially, the symptoms approach was developed simply as a research tool having some promise for measuring more realistically the level of health and of standards for medical care which characterized various

population groups—specifically rural vs. urban—in a way that would not be affected by the limited access of some rural families to physicians," Schuler said.

"If it should be possible, eventually, to develop a clearcut description of conditions, symptoms, or signs appropriate to certain age and sex categories which could be used by the average adult of normal intelligence and typical education as a guide to periodic review of his current health status and as a basis for paying a visit to his doctor for the purpose of obtaining proper medical counsel," he said, "the value of the method would be incalculable. But even though such a neat 'litmus paper' type of test may be utopian, the public of today is being exhorted to look for so many specific disease entities by so many special pleaders that some more unbiased assistance seems to be indicated."

### **Protein Intake Measured By Interview Technique**

The reliability of the dietary interview as a measuring instrument in determining protein intake has been "removed from the area of expert opinion to the area of measurable phenomena," said Robert B. Reed, Ph.D., associate professor of biostatistics and human ecology, and Bertha S. Burke, M.A., associate professor of maternal and child nutrition, of the School of Public Health, Harvard University.

They reported results of a project in which measurements were made of the dietary intakes of children, aged 1 to 6 years, living at home.

The dietary history technique measures average nutrient intake during a considerable period of time, Reed and Burke said. It requires a cooperative, intelligent informant and a trained nutritional interviewer able to gain the informant's confidence, and a standard set of procedures for translating lay descriptions of diets into scientific units of nutrient intakes.

The subject's usual pattern of eating is recorded in common household measures, and the extent to which the usual pattern varies is noted. A "cross check" is made by reviewing food intake in terms of specific foods or food groups, and contributes greatly to the reliability of the dietary data, they said. From information obtained at the interview and in the cross check, the interviewer decides how much of each food or food group is representative of the subject's average daily intake and calculates the average daily intake of food in terms of nutrient intakes.

### *Reliability and Validity*

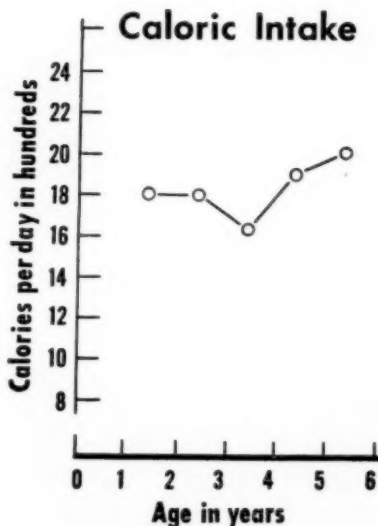
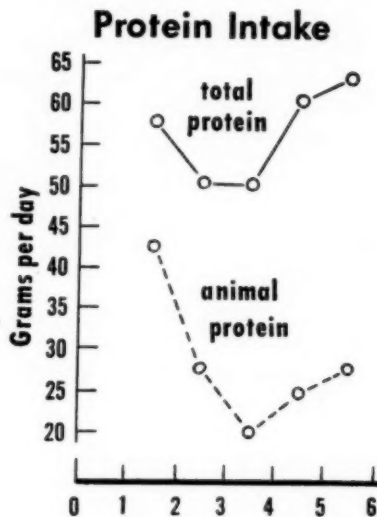
The reliability of a measuring instrument and of its ability to agree with itself is the first consideration in assessing performance, the speakers continued. Although it is not possible in taking dietary histories to repeat the process identically, something can be learned about the reliability of the method "by examining histories obtained year after year in the longitudinal followup of individual children." Reed and Burke reported that in this study "the annual observations have a reliability of 70.9 percent."

Results reported by the researchers indicate that the dietary interview makes it possible "to determine the average levels of protein intake between 1 and 6 years of age with a reliability approaching that found in anthropometric observations," but that the annual rate of increase in protein intake "appears to be a more subtle phenomenon . . . of only fair reliability." Nevertheless, they felt that "the reliability of the dietary history measurements seems to justify their further treatment as scientifically meaningful data."

The ability of the method to measure the quantities it is designed to measure has not been tested directly, they said, but they believe that "the care used in collecting the data as well as the associations which are being found between measurements



of nutrient intake and physical growth suggest that the validity level is satisfactory."



CASE NO. 91.

In their presentation on measuring dietary intake data, Reed and Burke presented several case history graphs depicting statistical values and reliabilities. Here is their case 91. At the top Mary's average daily intake of total protein is shown in grams from 1 to 6 years of age, also the corresponding amount of animal protein in her diet. At the bottom

the average daily caloric intake for the same period is charted. Was there anything in her case history to indicate the fall and rise shown in the graphs? Between 1 and 2, Mary had an excellent appetite, even showing an excessive gain in weight of 8 pounds and 4 ounces. Protein intake fell between 2 and 4 years, especially the animal protein. It was during this period, the social and medical records showed, that Mary's father became jobless and the family went on relief and a limited dietary regimen. The child's appe-

tite, however, never lagged. Mary herself posed several behavior problems during this trying period marked by obstinacy, moodiness, destructiveness, and disobedience. During the last 6 months of this difficult period, Mary's father earned a little more money and her mother found part-time work. Food was purchased more intelligently and better balanced meals were worked out. Whole grain cereals, molasses, and milk were significant and there were small amounts of eggs and meat.

## Community and Management Role in Industrial Health

*The case-finding role of local health departments in the field of industrial health was dramatically described before the health officers, industrial hygiene, and public health nursing sections in a joint session with the American School Health Association. One speaker cited several case histories in which industrial hazards had threatened the health and life of the community until team-like official attention and action solved the problems. Another speaker demonstrated the successful activity of a local industrial health council in cooperation with a local health department. Before the engineering and industrial hygiene sections, two papers were concerned with management's increasing awareness of the benefits of plant services and sanitation programs.*

### Industry Notes Benefits Of Plant Health Services

"Management is becoming ever more conscious of the dividends of increased productivity and improved employee morale resulting from the provision of clean, sanitary, and esthetically appealing places of work," according to Lt. Col. Alvin F. Meyer, Jr., USAF, chief of the engineering branch, professional services division, office of the surgeon, Headquarters of the Air Materiel Command at Wright-Patterson Air Force Base in Ohio.

In the future only broad guide-

lines may be established by official regulatory agencies with annual or even biannual compliance checks, and the plant medical services may actually function as small community health services, he continued. He felt that the shortage of qualified workers in official health agencies is a factor leading toward this development. Pressure exerted by socioeconomic forces has also played a part in industry's recognition of the value of health promotion and protection procedures, he said.

Meyer divided the component functions of an industrial sanitation program into three categories. Under the first, initial planning of plant or

work procedure, he placed such activities as proper design of building and equipment; and elimination of, or substitution for, toxic materials. Under the second, environmental surveillance and control, such as periodic visits to work and general plant areas; control of exposure of workers to chemical, physical, and biological agents; proper waste disposal or utilization; and insect and rodent control. The third category, production support, included quality control, advice on special problems, and community relations.

The degree of emphasis on individual activities depends on specific plant needs and on the ability and enthusiasm of personnel responsible for a sanitation program, the speaker declared.

### *Definition Problems*

The Committee on Industrial Sanitation of the APHA engineering section attempted to define the limits of this field, but has not arrived at any definite terminology, Meyer reported. Among the suggested definitions, he quoted this one: "Industrial sanitation is the application of scientific principles to the industrial environment in the interest of preserving or improving the state of health of workers or others affected by industrial operations."

Differences in training and interest may lead to widely varying definitions of industrial sanitation and to consideration of the problem from many different angles, Meyer said. The definition quoted includes the fields traditionally thought of as industrial hygiene and general plant sanitation, he noted.

The industrial hygienist is somewhat inclined to emphasize the problem of control of hazards arising from work exposures and to have only minor interest in plant water supply, general cleaning, and insect and rodent control, according to the speaker. "The sanitary engineer or the sanitarian engaged in general environmental health work, on the other hand, frequently views the problems of control of occupational

hazards as not being of concern to their function," he continued. Both these groups are prone to ignore measures for the prevention of accidents, he said, while management may regard industrial sanitation as a problem of cleaning floors and plant areas.

### **Management Looks Anew At Industrial Sanitation**

"Industrial sanitation is still in its infancy as a recognized function within industry," declared J. Lloyd Barron, C.E., sanitary engineer of the National Biscuit Company, New York. He attributed this to industry's failure to see industrial sanitation as a specialized management function and perhaps, because of insufficient personnel, to official health agencies' lack of attention to industrial needs.

Pointing out that during the past 40 years the work of official labor agencies and industrial hygiene units on certain phases of the problem has had tremendous effect, Barron went on to say that "industrial progress, high costs of labor, the new mode of industrial buildings, quality competition, and official pressures have all combined to make management take a new look at the problem of maintaining a clean working and manufacturing environment."

In some large plants, interest in greater plant efficiency and economy has resulted in establishing a separate management unit responsible for plant housekeeping and perhaps for the safety program, he noted. "As each industrial concern discovers the advantages of this arrangement in terms of greater operating efficiency in an orderly plant and greater employee comfort and satisfaction with cleaner working conditions and personnel facilities, the area of responsibility of the sanitation function increases and the director rises higher in the management organization," Barron said.

The field of industrial sanitation offers rewarding opportunities for

constructive and significant work to persons with technical and administrative training in public health work, Barron pointed out.

### *Industrial Sanitation Activities*

Barron divided the job of the industrial sanitation director into five groups of activities: surveys, inspections, and reports; personnel organization and training; selection and adaptation of techniques; selection and procurement of materials and equipment; and relations with regulatory agencies.

The basis of an industrial sanitation program, he maintained, is a continuing detailed examination of the physical properties, the technical process and mechanical operations, the water supply and waste disposal facilities, the kind and condition of raw materials, and their sanitary significance to human contacts. Analytical reports of findings and explicit, reasonable, and justifiable recommendations for corrective action must be made to inform and influence management, he said. He cautioned against making inspections too frequently, pointing out that they can become annoying rather than stimulating.

### **Industrial Health Aided By Birmingham Program**

Birmingham experience has delineated the contribution a local health department can make to an industrial health program, George A. Denison, M.D., health officer of the Jefferson County Board of Health, Birmingham, Ala., told the joint session of health officers, industrial hygiene, and public health nursing sections and the American School Health Association.

Denison referred to the aid the Jefferson County Board of Health gives to the Birmingham Industrial Health Council in its employee program of health education, multi-phasic screening, evaluation of abnormal findings by a part-time clinician, and referral to private

physicians for observation and treatment. The council now has 236 member firms employing 34,908 persons, he said. When it began in 1947 it had 9 member firms with 1,500 employees.

### *Supplements Critical Need*

The Jefferson County Board of Health has provided personnel and services to the program in accordance with the program's changing needs, Denison indicated.

This aid has ranged from the \$12,000 in salaries for personnel lent to the council in 1949 to the present more limited contribution of nurse participation in the evaluation clinic operated by the council and the health department and in followup of persons needing medical care or observation, Denison said. The council operates on a budget of \$52,000, he explained, and is now practically self-supporting.

Denison pointed out that the council's case-finding program for chronic disease supplements a critical need of the health department and the aid given the council allows the whole industrial community to participate in a preventive medicine program.

### *Program Kept Useful*

Emphasizing the need for constant appraisal and change to assure the complete usefulness of the program, Denison cited the diminishing returns on the annual screening tests for syphilis and diabetes.

In 1951 the prevalence of syphilis among employees was 5.5 percent, and for 1952-53 it was 1.4 percent—317 cases with 203 requiring treatment, Denison explained. The serologic test is now being limited to the groups of employees in which most of the cases were reported.

A change in intervals of testing and the selection of groups is also indicated for blood sugar testing, Denison stated, since the number of previously unknown diabetic cases discovered in the 1952-53 test was only slightly more than 2 per 1,000 employees. In 1949, he pointed out, 1.4 percent were diabetic suspects.

The number of tuberculosis suspects has remained fairly constant, Denison said.

Following the various screening tests, persons with abnormalities are given further tests at the evaluation clinic operated by the council and the health department to avoid unnecessary referral to personal physicians, he said.

Denison outlined the following clinic procedure: Abnormal measurements are rechecked. A full tracing is made for persons with hypertension or significant deviation on the 3-lead electrocardiogram. A 4- by 5-inch chest film and a urinalysis are made, and a public health nurse takes the history of prior illness. After evaluation of the records, the clinic physician refers the suspect to his personal physician should further observation and treatment be indicated.

After referral, Denison said, the health department assumes the responsibility for followup by mail, telephone, or field trip, as necessary, to determine if the case is under medical care.

Denison called attention to pre-employment examinations, added to the council's program in 1952. A total of 1,465 prospective employees were examined and 109 referred to the evaluation clinic in that year. With enlarged facilities, multiphasic screening before employment combined with a complete physical examination could become the most important phase of the program, Denison declared.

### **GP of Industrial Health Is Local Health Officer**

Considering the activities of the New Jersey State Department of Health and those of the local health agencies in industrial health, Miriam Sachs, M.D., M.P.H., chief of the State department's bureau of adult and industrial health, likened State health personnel to "specialists," and local health officers to "general practitioners" in that field.

Both the full-time and part-time

licensed health officers of New Jersey have become increasingly aware of the industrial complexity of the State and the specific needs of their respective communities, she declared, and they are beginning to serve as the "case-finders" in industrial health, referring situations that require further diagnosis and treatment—or investigation and regulation—to the State health department. "The State department of health has the major community responsibility for the establishment and maintenance of specialized industrial health services," she stated.

The wide variety of activities included today in industrial or occupational health, requires the combined public health team approach, she maintained, and a community with a budget large enough to support a formal industrial health program would have to be a fairly good-sized one, though apparently no standards comparable to 1 nurse for 5,000 people, for example, have been established in the industrial health field.

### *Joint Investigations*

Typical of several dramatic experiences in sharing community industrial health problems that she recounted was an investigation of suspected selenium poisoning. Following an employee's report that he believed his symptoms were due to some substance he handled in his daily work at a large industrial plant, the local health officer obtained an occupational history for the man and discovered that he worked in a unit fabricating selenium rectifiers, she reported.

Upon request from the local health officer, three engineers, an industrial hygienist, and a chemist, all from the State health department, made a plant survey. An industrial nurse and a physician explored medical records and interviewed the plant physician and nurses. Several cases of dermatitis of the face and hands, severe eye irritation, headache, and sinusitis-like symptoms were revealed. Selenium seemed to be the causative agent, Sachs stated.



"At the conclusion of the study," she said, "we were able to make specific engineering recommendations and, even more important, to write a medical control program designed to detect . . . the earliest symptoms of selenium poisoning or sensitivity." The program is now being applied in all plants in which selenium is used, all because a local health officer took the time to listen to the story of an illness and ask a few questions.

An exploding-sewer situation finally was solved in a panicky town when local and State health personnel conducted a month-long investigation. The accumulation of combustible gases in the suspect sewer line was methodically traced to industrial wastes discharged by an industrial plant a mile and half above the danger area. Without a letter of complaint ever being written to it, the plant built a treatment station for its wastes, Sachs said.

Prior to these experiences the staff of Sachs' bureau gave a course in industrial health to local health officers. The epidemiology of occupational disease, environmental cancer, industrial nursing services, ventilation, atmospheric pollution, radiation, pollution, insecticides, and the mechanics of plant survey were covered, and two industrial plants permitted their premises to be used as classrooms for the course.

"For us the distinguishing characteristic of all these investigations has been a curious kind of zest which brought us into close and intimate contact with the officials and citizens of the municipalities that make up the State," she concluded. "Qualified personnel with excellent training and background will always fall short in the performance of their duties unless they have this extra ingredient, the feeling for people and the willingness to share their trials and problems."

She referred to the program initiated in 1943 and ending in 1945, financed by the Commonwealth Fund of New York, which offered a 4-week training period in any 2 of 4 courses—bacteriology, serology, blood chemistry, and clinical pathology—to any full-time hospital or public health laboratory technician in the State. The program was planned by the Massachusetts Laboratory Approval Program in cooperation with the graduate department of the Tufts Medical School, which arranged the courses as part of the special training program of the New England Medical Center, she explained.

This program offered equal opportunity for all technicians in the State since it paid not only tuition but also travel expenses to and from Boston, she stated. It also paid the salaries and travel expenses of two technicians who took the place of the trainees in their home laboratories. Thus, the trainees were relieved of the burden of daily work, and the laboratories, which usually cannot spare a worker for the time needed for training, were given replacements, she pointed out.

Noting that only 20 persons a year could receive training under this type of program, Gillette believes many more than that number felt its influence. The trainee's co-workers may well have benefited by information obtained from the visiting technicians and from the trainees upon their return, she said, declaring that if the State could make refresher courses available on a continuing basis, the program might eventually have a very important effect in the training of technicians.

### Recognition of Need

Citing the rapidly changing and increasing number of laboratory techniques as a factor contributing to the shortage of qualified laboratory personnel, Gillette pointed out that a large number of technicians employed in Massachusetts are high school graduates with only 9 months of additional technical training.

As early as 1939, when the lab-

## Current Laboratory Tests And Performance Methods

*Two papers pointing to methods which public health laboratories can use to alleviate critical shortages in technical personnel were read before the Conference of State and Provincial Public Health Laboratory Directors. One suggested a revision of existing classifications and training of specialists and the other showed how a State-supported refresher-training program successfully builds a reservoir of competent personnel. The needs of the civil defense program were expressed to the laboratory section in terms of trained and professional laboratory personnel. The present status of tests for toxoplasmosis, an evaluation of the bacterial hemagglutination test in determining Escherichia coli antibody response of patients, a rationale of disc plate sensitivity testing, and the antibiotic effects on research animals were discussed in other papers.*

### Refresher Courses Meet Lab Technicians' Need

Massachusetts' subsidized refresher training program for laboratory technicians has demonstrated

advantages over other types of programs, declared Helen H. Gillette, B.S., chief, diagnostic laboratory, institute of laboratories, Massachusetts Department of Public Health.



## LABORATORY PERSONNEL

oratory approval program began, she stated, the department of public health recognized that laboratory technicians who had no training in bacteriologic and serologic testing techniques were attempting such work. An attempt to provide the needed training was a course in public health laboratory diagnosis offered in 1941 as a part of the State's education extension program, she reported. This course, consisting of lectures and demonstrations, however, was clearly inadequate and was not repeated, she said.

She also mentioned the 1-semester laboratory course in medical bacteriology, with classes 2 evenings a week, which has been offered for the past 3 years at Boston University Medical School, at the request of the Massachusetts Association of Medical Technologists. The course has been filled to overflowing, she said, but technicians from laboratories outside commuting range of Boston are unable to take it.

### Medical Laboratories Urged To Employ Balanced Staff

Pointing to the current critical shortage of competent medical laboratory assistants, Edwin E. Ziegler, M.D., director of laboratories, St. Joseph's Hospital, Lancaster, Pa., urged recognition administratively and economically of four grades of assistants: medical technicians (high school graduates); medical technologists (2 years college); clinical chemists and clinical bacteriologists (bachelor's or master's degree in science); and clinical laboratory specialists (doctorate degree in science).

Addressing the Conference of State and Provincial Public Health Laboratory Directors, Ziegler declared: "It is only in this way that we can obtain sufficient numbers of trained assistants, maintain standards, and preclude erroneous methods and reports."

He recommended that a medical laboratory staff include a director, a

laboratory specialist, a clinical chemist, a clinical bacteriologist, 1 or 2 medical technologists, and 1 or 2 medical technicians. He considers a director, 3 technicians, and 3 technologists, as employed in the "average" medical laboratory today, an unbalanced staff.

### Graded Training

Urging medical laboratories also to offer graded training programs for personnel both with and without degrees, Ziegler declared that the attempt to train "all purpose" technologists has failed because it is impossible to train a person to proficiency in 1 year in the fields of histology, biochemistry, hematology, bacteriology, serology, blood-bank techniques, basal metabolism, and the other miscellaneous routine tests.

By requiring greater specialization on the part of the technicians, students with less formal education can be accepted for training, he said. He pointed out that many of the rule-of-thumb tests and procedures can readily be taught to intelligent high school graduates. Ac-

ceptance of high school graduates for training as technicians is one positive approach to increasing the supply of medical laboratory assistants, he indicated.

Medical laboratories also must recruit and train more college graduates for positions in chemistry and bacteriology, Ziegler specified. He maintained that recruits are available. It is only necessary for medical laboratories to offer them sufficiently attractive positions, he stated.

Ziegler recommended that, when possible, technicians and technologists be offered at least their room, board, and laundry services during their period of training, adding that in lieu of this there should be an honorarium or scholarship.

### BW Defense Requires Trained Personnel

"The success of the entire defense against biological warfare depends upon the availability of trained, competent professional and technical

## Lasker Award Address

In tribute to the winners of the Lasker awards, T. Duckett Jones, M.D., director of medical research of the Helen Hay Whitney Foundation, recommended steps to support basic research in balance with studies for developing and applying seminal knowledge.

"The creative scientist himself . . . is usually the only individual capable of visualizing or appreciating the value and importance of such knowledge," he said. Adding that "it is impossible to project the means and methods whereby such knowledge comes," he suggested that "we seek better means of identifying potentially capable future intellectual and scientific contributors, and see that adequate op-

portunities exist for their training and . . . testing."

Also, he said, "Present scientists of outstanding qualifications need to be supported with as little restraint, control, direction, and distraction as is consistent with our economy and the urgency of special needs for national security and existence."

While technological progress is acclaimed as proof of the value of applied research, he said, "one rarely hears reference to the fact that this progress has been made possible primarily as the result of basic and undirected research of a large number of scientists . . . over . . . nearly a century. Most of these scientists were Europeans."

personnel," declared John J. Phair, M.D., Dr.P.H., professor of preventive medicine, University of Cincinnati College of Medicine, and consultant on biological warfare to the Federal Civil Defense Administration.

Indicating that the main bulwark against biological warfare is the knowledge of the epidemiology and control methods for human, animal, and plant diseases, Phair specified that no special defense training or unusual background for personnel is necessary. He recommended, however, refresher courses in some of the standard procedures in, for example, diagnosis and treatment of the communicable diseases and emergency sanitation.

### *Broad Approach*

Phair emphasized the necessity for a broad approach to the preparation of a defense against biological warfare since "the lists of agents and methods of dissemination that might be used are long and varied. It would be ridiculous to prepare for a single agent or to assume that a determined aggressor would not take advantage of the opportunity to pick and choose his weapon."

"The health departments, animal and plant disease control agencies, physicians, veterinarians, and the public must all be prepared to combat whatever infectious agents or pests may be introduced," he said. "Measures to be taken include identification of the agent, prompt reporting of cases, protection of susceptibles, treatment or, for animals and plants, eradication of infected hosts, and disinfection of contaminated areas."

Phair specified that the channel for obtaining assistance in diagnosis and therapy for diseases in man can follow the peacetime pattern: physician to local health agency to State health department to regional director of the Public Health Service. The regional director should seek aid from the sectional research program of the National Microbiological Institute, National Institutes of Health, and the Communicable Dis-

ease and Environmental Health Centers, Public Health Service; the Federal Civil Defense Administration, regional and national; and the Department of Defense, he said.

### *Diagnostic Laboratories*

Phair gave the following steps as examples of what the diagnostic laboratories can do at the present time: Survey the facilities which may be required, including equipment and reagents now available; plan procedures and steps to be taken to meet emergency needs; designate personnel to be prepared to handle specific diagnostic laboratory procedures and routines; and strengthen the channels of communication for immediate reporting and interchange of information at the working level.

Noting that the United States is better equipped to meet the threat of biological warfare attack than many countries, Phair stated that rapid detection and identification methods are among our major needs. New techniques, apparatus, and materials are required, he said.

### **Describes Current Tests For Toxoplasmosis**

Much is to be learned about the prevalence and distribution of toxoplasmosis, still in its infancy as a recognized human disease, M. M. Brooke, Sc.D., chief of the Parasitology and Mycology Section, Laboratory Branch, Communicable Disease Center of the Public Health Service, told the Conference of State and Provincial Public Health Laboratory Directors. Still needing much study are clinical manifestations, transmission methods, and response to therapeutic agents.

"Laboratories have no practical method for culturing the organism, generally accepted as a protozoan," he said. "Various species names have been given to the *Toxoplasma* found in different hosts, but there is probably only one species, *Toxo-*

*plasma gondii*, which is capable of readily infecting most mammals and birds."

### *Indirect Demonstration*

The organism responsible for toxoplasmosis can seldom be demonstrated in the patient, Brooke continued, but laboratories do possess ways of indirectly demonstrating that the patient has had contact with the infectious agent.

Generally, two definite types of toxoplasmosis occur, Brooke reported: congenital toxoplasmosis, which is usually acquired in utero, and acquired toxoplasmosis, which is acquired later in life. The majority of reported cases are congenital, he said.

"Until a few years ago, it was thought that all individuals infected with *Toxoplasma* developed clinical symptoms and eventually succumbed to the disease," Brooke stated. "Now it is recognized that asymptomatic or latent infections occur and that the symptomatology depends upon the stage of the disease and the organs which are affected."

There are no characteristic symptoms which are sufficiently reliable to establish a diagnosis of acute toxoplasmosis, either in infants or adults, he continued.

### *Laboratory Diagnoses*

Current laboratory diagnoses are established by microscopic demonstration of the organism, by animal inoculation, and by serologic demonstration of antibodies, Brooke reported. Four serologic tests—the rabbit skin neutralization test, the complement fixation test, the methylene blue dye test, and the skin test—have been used to demonstrate antibodies.

Of the serologic procedures, the methylene blue dye test reported by Sabin and Feldman in 1948, Brooke said, is generally recognized as the most sensitive procedure in use today. Describing the test, he said:

"The antibodies modify the *Toxoplasma* organisms in such a way that they do not stain with methylene blue. In performing the test, four-

fold dilutions of the serums are prepared and mixed with equal amounts of a suspension of living toxoplasmas (mouse peritoneal fluid diluted with normal human serum). After incubation at 37° C. for 1 hour, alkaline methylene blue is added to each tube. Mounts are prepared and examined microscopically to determine the proportion of stained and unstained (modified) toxoplasmas. The highest dilution of the serum that has at least 50 percent of the organisms modified is regarded as the end point or titer of the serum."

Antibodies demonstrated by the methylene blue dye test, Brooke added, are considered to develop early in the course of the disease, and they remain at a demonstrable level for several years, if not for life.

"The most definitive evidence of toxoplasmosis is the actual demonstration of the organism in the patient, by microscopic determination," Brooke stated. "Unfortunately, in most instances where this has been accomplished, it has occurred at autopsy. In a few instances, the organisms have been demonstrated in the living patient in lymphnodes removed by biopsy and in the sediment of spinal fluid."

Organisms may be present in such small numbers that it may be difficult to demonstrate them in the material obtained directly from the patients, Brooke pointed out. "Tissue suspensions, blood, sediments of body fluids, and other similar materials can be inoculated into a number of laboratory animals—laboratory white mice are preferred—in an effort to have the organism, if present, multiply to a demonstrable level."

## Bacterial Hemagglutination A Diagnostic Tool?

Data obtained in studies on the *Escherichia coli* hemagglutination test indicate the method is potentially useful "as a diagnostic tool for the study of *E. coli* antigens and the demonstration of *E. coli* antibody response of patients," declared Erwin

Neter, M.D., director of the department of bacteriology, Children's Hospital, Buffalo, N. Y., and assistant professor of bacteriology, University of Buffalo.

Explaining the considerations behind the development of this test, Neter pointed out that the concept of appendicitis and of certain forms of infantile diarrhea as true *E. coli* infections, advanced by several investigators, would be greatly strengthened were it possible to demonstrate an antibody response of the patients to the particular types of *E. coli*. This has rarely been possible by means of the conventional bacterial agglutination test, he said.

## Diarrheal Disease Studies

One of the studies on the *E. coli* hemagglutination test mentioned by Neter was an investigation of the development of group-specific antibodies in adult human volunteers following ingestion of *E. coli* 055, one of the serogroups found to be associated with epidemic diarrhea of the newborn. "An increase in *E. coli* 055 hemagglutinin titers occurred in all persons receiving the organisms in large numbers and in two-thirds of those receiving smaller numbers," he stated, adding that the titers of *E. coli* 055 hemagglutinins were from 5 to 20 times higher than titers obtained by the conventional bacterial agglutination test.

Neter also reported that the titer of bacterial hemagglutinins against a "normal" strain of *E. coli* did not increase following ingestion of this strain in large numbers and pointed out that the difference in the antibody response to living *E. coli* 055 and "normal" organisms is reflected in clinical effects: *E. coli* 055 produce gastrointestinal disturbances whereas "normal" organisms do not.

## Appendicitis Studies

A study of 18 patients with appendicitis complicated by peritonitis gave clear evidence "that the hemagglutination method was far more sensitive than the conventional agglutination test," Neter said. In 15 out of 18 patients, either a significant

increase in homologous *E. coli* hemagglutinins or a high titer of these antibodies was demonstrated, but bacterial agglutinins could be demonstrated in only 3 of the 18 patients and the titers were low, he reported.

Summarizing data from another study, Neter noted that 6 out of 8 appendicitis patients without peritonitis showed either a rise in titer or had homologous hemagglutinins in titer of 1:160 or higher, but only 2 of the patients had or developed bacterial agglutinins.

Neter felt that, on the basis of data so far obtained, further investigations of the *E. coli* hemagglutination test are justified.

## Reference Plan Available For Water Analysis

The Environmental Health Center has devised a reference analysis plan for the evaluation of procedures used by State public health laboratories in the chemical analysis of water, according to Paul Kabler, M.D., Ph.D., chief, Bacteriology Section, Environmental Health Center, Public Health Service.

The plan was formulated because the Environmental Health Center lacked sufficient resources for filling requests from many States for detailed analysis of multiple samples, Kabler told the Conference of State and Provincial Public Health Laboratory Directors.

Solutions containing usual components and components of particular interest to individual laboratories will be prepared and shipped to State laboratories requesting the service, Kabler reported. He said that comparative analyses will be made by the State laboratories and by the Center. Should discrepancies in the analysis results occur, the Center will try to determine the cause through consultation with laboratory personnel, according to the speaker.

He said that discrepancies of three general types were anticipated: (1) failure to comply in detail with Standard Methods for the Examination of Water and Sewage; (2) am-



biguities in the wording of standard methods, leading to a range of interpretation; or (3) actual inadequacy of analytical methods. Discovery of any of these causes of nonuniformity in results might lead to bases for correction of local laboratory practices, editorial revision of standard methods, or elimination of inadequate procedures, Kabler said.

He reported that a successful test of this reference analysis plan has been completed with the cooperation of one State department of health. The service is now available to other State and Territorial health departments upon request directed through their respective Public Health Service regional offices to the Environmental Health Center, Kabler stated.

### Evaluates Laboratory Tests Of Antibiotic Effects

Clinical responses to antibiotics should not be predicted inferentially from experimental *in vivo* trials, cautioned Howard E. Lind, Ph.D., M.P.H., director, and Ellen M. Swanton, M.S., research assistant, Sias Laboratories, Brooks Hospital, Brookline, Mass.

"There is no substitute for a direct comparison between *in vitro* trials, by disk or by tube dilution, and clinical response. . . . A sensitivity test at its best is a qualitative not a quantitative guide to therapy," they said. Laboratory workers were advised to consider the organisms usually encountered in the body fluid under examination, to establish an upper limit of sensitivity to the antibiotics tested, to bear in mind that no *in vitro* method gives 100 percent correlation with clinical response, and to report to the physician resistance or sensitivity to several antibiotics, as final judgment is his.

"Sensitivity determinations can give greatest assistance when therapy can be instituted against a specific micro-organism," they noted and recommended elimination of certain routine sensitivity determinations.

Comparing tube dilution tests with the disk method, the authors said, "In neither case can these end points

be utilized to tell the physician how much of the antibiotic should be used. This is a matter to be determined by trial and error of the physician with the recommendations of the manufacturer, at least for a specific antibiotic."

"The value of a sensitivity test to the physician lies in an indication of *in vitro* sensitivity of an organism to one or more antibiotics. The physician in having a choice can anticipate a favorable response. This in time will reduce the promiscuous use of antibiotics."

The disk plate method, rather than the serial tube dilution method, was recommended for routine use. Apart from savings in time and costs, they said, "the disk method can provide an interpretable end point which is comparable to that provided by the tube dilution method."

### Antibiotic Effect Varies In Research Animals

The exercise of caution in deciding whether or not to use antibiotics in natural food stock diets formulated for mice, rats, guinea pigs, and laboratory rabbits was urged by Charles A. Slanetz, Ph.D., scientific director for the Institute of Research in Animal Diseases, Columbia University College of Physicians and Surgeons. He pointed out that in his study the response of different species of laboratory animals to antibiotics varied greatly, particularly when they were fed over a long period of time.

"Whether the advantages of including antibiotics in . . . stock diets outweigh the disadvantages will depend largely upon the experimental procedure involved and on the judgment of the investigator," said Slanetz.

Stock diets containing no added antibiotics are preferable for rabbits intended to be used in microbiological studies, Slanetz stated. He reported difficulty in producing spirochete lesions in rabbits whose diet included antibiotics. The control group fed on stock diets not con-

taining antibiotics were satisfactory for this purpose, he declared.

Perhaps the most consistent response of animals fed antibiotics in stock diets has been in the field of antibody production, according to Slanetz. "It has been shown in this laboratory that rats and mice fed antibiotics in stock diets over short periods of time yielded higher agglutinin titers for *Salmonella* antigens than those fed the control diet," he said. With prolonged feeding of antibiotics, and antibiotic residues, an adverse effect on antibody production takes place. The most recent work in this area of investigation has been done with two antibiotics, bacitracin and streptomycin, he reported.

### No Decrease in Morbidity

Specifying that morbidity and mortality records were kept on rabbits receiving antibiotic supplements and on a control group, Slanetz stated that no significant differences were noticed in the incidence of snuffles and intestinal disturbances among the two groups.

He reported, however, a definite effect on excretion of coccidia oocysts in the groups receiving antibiotic supplement, aureomycin T.F.-5, at a level of one-fourth of one percent in their diet. The trend, he said, was toward the excretion of few oocysts or their disappearance from the feces. He considered the results, though no conclusive evidence was found that the infestation was eliminated in any individual animal, sufficient to justify continuing observations on several generations of rabbits.

The antibiotic-containing rations had no appreciable effect on the rabbits' rate of growth, Slanetz continued. A group of control animals fed on commercial pelleted diets without the addition of antibiotics showed superior weight gains, he said. He noted that this observation confirmed a thought expressed by other investigators that "antibiotic residues are not a substitute for good quality protein in a ration containing protein of low availability."

# Use of Modern Health Methods In India, Japan, and Korea

*Smallpox, tuberculosis, and the diseases caused by intestinal parasites are facing new foes in certain Asian areas. From India came encouraging reports of the use of vaccinia gamma globulin, experimentally produced, against smallpox. From Korea, where water and food constitute obstacles of first magnitude both to military and civilian populations, came reports on the efforts to institute control programs. In Japan, tuberculosis seemed at long last to be tumbling from its pinnacle as the leading killer. The epidemiology and laboratory sections and the Conference of Public Health Veterinarians heard the reports.*

## India Tests Gamma Globulin Vaccine Against Smallpox

Vaccinia immune gamma globulin, experimentally produced, showed promise as an adjuvant to vaccination in the prevention of smallpox during its first field trial in India early in 1953, C. Henry Kempe, M.D., assistant professor in the department of pediatrics, University of California Medical Center, disclosed.

This type of gamma globulin also showed promise as a specific therapy for the complications of vaccination during its first clinical use a year ago, Kempe said.

### GG Production

The vaccinia immune gamma globulin used in the studies was produced from the blood of donors who had experienced a successful smallpox vaccination—either a primary take or a marked vaccinoid reaction—from 4 to 8 weeks prior to their donation, the optimal time for obtaining the most antibody response, Kempe explained.

In the laboratory this material was shown to possess large amounts of neutralizing antibodies, Kempe said. The several lots of regular gamma globulin tested revealed relatively small amounts of neutralizing

antibodies against the vaccinia-variola group of viruses. The field study, he explained, was conducted to determine if large amounts of neutralizing antibodies, given fairly early in the incubation period of smallpox, would modify or even help prevent the disease.

### Field Trial Results

During two smallpox outbreaks in India, family contacts of hospitalized smallpox patients were promptly vaccinated against smallpox by the routine procedure, Kempe related. Alternating family groups received a 0.06 cc./kg. injection of vaccinia immune gamma globulin from 12 to 24 hours following smallpox vaccination.

Of 75 persons in the control group who were vaccinated only, 9 had smallpox. In the group of 54 family contacts who received vaccinia immune gamma globulin, there were no cases of smallpox. Thus, Kempe indicated, vaccination within 2 or 3 days after exposure does not prevent smallpox, as is commonly held. Vaccinia immune gamma globulin plus vaccination appears to be superior, he said.

In clinical use this material appeared to be effective in the treatment of children in whom the vaccinia virus has infected eczema

lesions, for generalized vaccinia, and for vaccinia necrosum, Kempe said. He believes that it will find its widest domestic use for these conditions.

### Concerted World Drive

From observations in an endemic area, Kempe drew additional conclusions. In endemic areas, he said, several insertions, preferably 3 or 4, have a definite advantage over single insertions in lowering the incidence and severity of smallpox. Successful yearly vaccination is required to positively protect against smallpox in an endemic area, and vaccination, in order to solidly protect, must be successfully performed before rather than after exposure to the disease, Kempe concluded.

The World Health Organization, Kempe observed, is about to initiate a concerted drive in an effort to reduce dramatically the incidence of smallpox in Africa and Asia, where it remains a major disease. The increasing use of lyophilized calf lymph will obviate the necessity of refrigeration in tropical areas, long a stumbling block in efficient vaccination procedures, he said. He added that recently developed improved egg vaccines show promise in providing great quantities of sterile and active material quite inexpensively.

## Japan Sharply Reduces Tuberculosis Mortality

By 1951, tuberculosis dropped from its place as the leading cause of death in Japan to second place, largely because the occupation forces focused their attention on it, Brig. Gen. Crawford F. Sams, MC, USA, reported.

From 1932 to 1951 tuberculosis was the leading cause of death—in fact in 1945 it was responsible for more Japanese deaths than the combined allied air raids, including the atomic attacks, Sams said.

"An analysis of the death rates from tuberculosis by 5-year age

groups shows that the death rate from tuberculosis for the entire population, which includes both immunized and nonimmunized groups, was reduced from a peak in 1945 of 282.2 per 100,000 per annum to 82.1 in 1952. This represents a startling drop of 70 percent in 7 years," Sams stated.

### *The Problem*

The Japanese, with the highest population density in the world, live 8 to 12 people in a room and habitually sleep on their backs with head rests, the ideal position for the dissemination of droplet infections, he said. The rooms are sealed tight in winter since there is no heating in the homes. Obviously, these conditions afford a great opportunity for spreading tuberculosis, he commented.

If positive tuberculin (Mantoux) tests indicate the presence of acquired tuberculosis infection, then the Japanese acquire such infection early in life. Two percent of Japanese children under 1 year were tuberculin positive; 44.9 percent of those in the 10- through 14-age group and 76.6 percent of those in the 25- through 29-age group were tuberculin positive, Sams noted.

Of the 54 million Japanese under 30, 25 million, or 46.6 percent, acquired natural infection, Sams reported. About 30 million could be protected if immunized against tuberculosis, he maintained. This has been done, he said.

### *Case-Finding Activities*

A tuberculosis control law, which now requires that all persons under 30 be tuberculin-tested, was passed, Sams reported. If the test is positive, a 35-mm. film is made to determine whether the case is active, he reported. A suspicious first picture requires a larger X-ray, a physical examination, a blood sedimentation rate, and repeated sputum tests, he added.

When a nationwide health center system was organized during the occupation, the tuberculosis control

division of each center was established as a major function, Sams said.

During the first year under the new control law, 380,000 new cases were diagnosed, Sams said. In the second year, 400,000 active cases were found and in 1952, 590,000 active cases were reported, he said. As case-finding methods were improving, the death rate was rapidly dropping, Sams commented.

### *BCG Immunizations*

In 1943, the Japanese Research Council had evaluated BCG research work done between 1927 and 1943 and recommended the extensive use of BCG, Sams reported. The program collapsed because of the war. The occupying powers began to push this program in 1945, first immunizing the age group with the highest death rate—the 19- to 24-year-olds, Sams related.

In 1945, 3,098,000 tuberculin negative young people were immunized with BCG, Sams reported. The figure rose to 8 million in 1948, and the program was then stopped from December 1948 to October 1949 because of dissatisfaction with the analysis of the reconversions of tuberculin reactions, he said. Because variations were found in the potency of BCG vaccine from 11 laboratories, it was decided to convert to a dry vaccine which was produced in 1 laboratory and which retained its potency for more than 1 year when refrigerated, Sams stated.

The immunization program using the dry vaccine was resumed, and in 1950, 13 million immunizations or re-immunizations were given, Sams said. Now, Japan has the world's largest immunization program, an achievement which has drastically reduced tuberculosis deaths under the worst environmental conditions, he said.

### *Other Steps Taken*

A school lunch program was initiated to supplement dietary deficiencies found among the Japanese to help build resistance against

tuberculosis, he stated. The number of tuberculosis beds was increased from 25,000 in 1945 to 101,000 in 1951, and treatment with streptomycin and PAS will reduce deaths and reduce the reservoir of active cases which serve to spread the disease to others, Sams concluded.

## **Food and Water in Korea Are Main Problems**

Food and water are the paramount items in military public health in Korea, stated Capt. Robert A. Lopez, D.V.M., VC, USAF, 3650th Medical Group, Sampson Air Force Base, New York, before the Conference of Public Health Veterinarians.

Basing his comments on 18 months' experience in Korea as command veterinarian for the 5th Air Force, Lopez pointed out that although food supply may not seem to be a proper concern of military public health, it becomes a concern when skin diseases increase in frequency, ordinarily clear complexions become affected with acne, sores and cuts heal slowly, and rashes come and stay.

Indigenous foods, he said, represented a very special problem since the rice, kimchi, and seafood appealed to many men who were willing to risk unknown dangers for a gustatory adventure. Sea food seemed to be the chief source of *Clonorchis* infections among Koreans, probably as the result of lack of, or improper, cooking, he explained.

In regard to water, the veterinarian reported that due to battle conditions it was often necessary to dispense with flocculation and sedimentation and to depend mainly on portable diatomite filters followed by hyperchlorination, residual chlorine being kept to 5 to 10 p.p.m.

"The importance of preemployment physical examinations for the natives was long debated," he said in discussing mess sanitation. However, with preliminary surveys revealing a "shockingly high tuberculosis rate and a staggering variety of



## SMALLPOX VACCINE

intestinal parasitisms," there remained little argument against such examinations, except with the magnitude of laboratory work required.

### Intestinal Parasites Infect Korean Veterans

Forty-eight percent of 1,813 Korean military returnees at Fort George G. Meade, Md., were found to harbor intestinal parasites, reported Lt. Norman E. Wilks, MSC, chief of the parasitology section, Second Army Area Medical Laboratory, Fort George G. Meade, and Bessie Sonnenberg, parasitologist on the laboratory staff.

The infection rate for four specific parasites—*Endamoeba histolytica*, *Endolimax nana*, *Trichocephalus trichiurus*, and *Trichostrongylus* sp.—exceeded the reported rate in the United States, they specified. They did not believe, however, that intestinal parasites in Korean returnees would present a public health problem beyond that which already exists in this country.

"One of the factors that will determine the spread of the imported parasites in this country is the dispersal of the groups of military personnel upon separation throughout the civilian population," they stated. "The number of veterans in any one community will be too few to effect the incidence of intestinal parasites." They pointed out that most of the 1,813 returnees had more than 8 months of duty in Korea, a period of time sufficient for them to acquire many of the parasites common to that region. The helminth infections did not occur in numbers for troops returning from an endemic area like Korea, they said.

### Food Handlers

Noting that all Korean returnees in the Second Army Area who are to be reassigned as permanent food handlers are routinely examined for intestinal parasites, the investigators reported that of 586 food han-

dlers in the group of 1,813 persons examined, 255 (43.5 percent) harbored intestinal parasites.

The most interesting fact about these food handlers, they said, is that their parasite infections were without apparent clinical symptoms. Thus, they noted, "these 'healthy carriers' would have gone undetected and would have been placed in positions which theoretically would have enabled them to transmit parasites to susceptible persons, had routine multiple stool examinations not been performed."

The species of parasites found in the food handlers varied little from

those found in the entire group, they stated.

### Infection Rate High

The 48-percent rate for Korean veterans at Fort Meade is probably the highest reported for military personnel returning from the Far East, Wilks and Sonnenberg remarked. They considered the fact that several stools from each individual (the number averaged 3.2) were examined as probably accounting for the high rate. Only 1 other report, they said, has given a rate exceeding 33 percent.

## The Trend in Immunology: Antigens, Phages, Vaccines

*Advantages of the chick embryo method of producing smallpox vaccine, the performance of a new triple antigen against diphtheria and tetanus, and the isolation of four bacteriophage strains active against Mycobacterium tuberculosis, were reported in a laboratory section session.*

### Chick-Embryo Vaccine For Smallpox Reassessed

Among the obvious advantages of the chick-embryo method of producing smallpox vaccine over calf lymph vaccine in addition to control over bacterial contaminants is the fact that in an emergency it is possible to produce large quantities of vaccine in a short time. So stated Victor J. Cabasso, Sc.D., research virologist, Ida Faye Moore, bacteriologist, and Herald R. Cox, Sc.D., director of viral and rickettsial research, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y., and Robert F. Korns, M.D., Dr.P.H., director, bureau of epidemiology and communicable disease control, New York Department of Health.

Nevertheless, they warned, in spite of the advantages of the chick-embryo method, the fact not to be overlooked is that the vaccine is primarily intended to control smallpox. Important, they said, is the question of whether the propagation of vaccinia virus in a foreign host such as the chick embryo will have a detrimental effect on its immunogenic properties. They stated that a report of an outbreak of smallpox in India indicates that, although reactions to vaccines of chick-embryo origin were generally milder than to those of calf-lymph origin, apparently "within a period of 5 years from vaccination, no difference could be noted in the amount of protection afforded by either type of vaccine."

Cabasso and his associates said that vaccinia virus, unlike most viral agents grown in chick embryos, re-

### Schedule of vaccination of children with four different vaccine preparations

Group No.	Number of children	Average age (months)	Type vaccine	
			Right arm	Left arm
I.....	24	12	A	B
II.....	26	26	A	C
III.....	24	34	A	D
IV.....	12	10½	-----	B
V.....	8	33	-----	C
VI.....	10	40	-----	D

quires no adaptation period in the chick embryo. Furthermore, they continued, the virus needs no additional modification and it can be used for human vaccination from its first passage in the chick embryo.

#### Experimental Results

The results of experimental vaccination of 104 children, ranging in age from 4 months to 6½ years, 103 of whom had never been vaccinated, were reported. Smallpox vaccine preparations of calf lymph or chick-embryo origin, glycerinated or vacuum-dried, were used. The children were divided into 6 groups, and each group was vaccinated according to the schedule given in the accompanying table. Daily measurements were made of the areolas and individual tracings were transferred to a permanent record. In addition, photographs were taken daily on Kodachrome film of the reactions of 6 children from each of the first 3 groups, selected at random on the day of vaccination.

Evaluation of results revealed no qualitative or quantitative differences between primary takes following vaccination with all four vaccines, they said, and added the following findings:

All but one of the children showed typical primary takes, whether they had been vaccinated on one or both arms and regardless of the type of vaccine used. The size of reactions, evolution of the takes, and time at which the erythemas reached their maximum sizes were comparable for all types of vaccines. Individual

erythemas reached their peaks on the ninth postvaccination day. There were no qualitative differences among reactions or in the degree of induration and subcutaneous swelling. In both white and Negro children the scars looked normal and were about the same size 40 days after vaccination, and there was no indication of keloid formation.

Further studies on large-scale use of chick-embryo propagated smallpox vaccine are being carried on, they concluded, to investigate the antigenicity of this vaccine as compared with that of calf lymph.

### Immunization Results Good With New DTP Antigen

Negative Schick tests and protective levels of antitoxins for diphtheria and tetanus were found in

100 percent of 213 infants who were given primary immunizations of a new triple antigen—DTP, aluminum phosphate adsorbed—against diphtheria, tetanus, and pertussis. In 90.1 percent, pertussis agglutination titers were 1:320 or more.

Louis W. Sauer, M.D., Ph.D., associate professor of pediatrics, Northwestern University Medical School, and Winston H. Tucker, M.D., Ph.D., commissioner of health, Evanston Health Department, Evanston, Ill., reported these results after administration of 4 monthly doses of 0.5 ml. each to infants at ages 3, 4, 5, and 6 months. The new antigen they said was "well-tolerated" by the infants in the test group.

Each dose of the antigenic mixture contained highly purified diphtheria and tetanus toxoids, adsorbed in standardized proportions on aluminum phosphate, and 15,000 millions of killed *Hemophilus pertussis* of proved antigenicity grown in liquid medium without blood, they said. Because of a recent increase in reported cases of infectious and serum hepatitis, the Public Health Service has requested, as a precautionary measure, "discontinuance of the use of human blood or its unsterilized fractions in medium for cultivation of *H. pertussis* to be used in pertussis vaccine," they said.

None of the 852 doses of antigen was followed by alum cyst, the scientists stated, whereas 2 of the 652

### Results of immunity tests for diphtheria, tetanus, and pertussis, using DTP antigen, aluminum phosphate adsorbed

Group	Number of infants injected	Diphtheria		Tetanus	Pertussis	
		Schick test negative (percent)	Anti-toxin 0.1 unit or more per ml. (percent)	Anti-toxin 0.1 unit or more per ml. (percent)	Number showing agglutination 1:320 or more	Percent immunized
Home (free-living).....	132	100	100	100	117	88.6
Orphanage.....	81	100	100	100	75	92.5
Total.....	213	100	100	100	192	90.1

doses given 163 infants in an earlier study, using DTP, alum-precipitated antigen, had terminated in sterile alum cyst. Febrile and local reactions were milder in the group reported by Sauer and Tucker than in the infants in the previous study. No febrile reaction lasting more than 2 days was reported and none of the 852 injections was followed by hyperpyrexia, convulsions, or discharging cyst.

#### Four Antituberculosis Phage Strains Isolated

Four strains of bacteriophage active against human virulent, human avirulent, and bovine strains of *Mycobacterium tuberculosis* and other acid-fast bacilli were reported isolated by Seymour Froman, Ph.D., microbiologist, and Emil Bogen, M.D., chief pathologist, Olive View Sanatorium, Olive View, Calif. Two of the four strains had been reported at the National Tuberculosis Association Meeting at Los Angeles, May 19, 1953.

Although several workers have reported phages active against saprophytic acid-fast bacilli, these appear to be the first strains known to act on *M. tuberculosis*.

The bacteriophages, all obtained from soils enriched with mixed cultures of saprophytic acid-fast bacilli, were successfully propagated from single plaques through repeated transfers. They maintained specific activity on susceptible cultures. The authors stated that demonstration of the activity of bacteriophages requires special technique, "as it may be inhibited by a variety of factors."

The experiments suggest that varieties of tubercle bacilli can be separated on the basis of their susceptibility to lysis by bacteriophage. Five patterns of susceptibility were discerned. This aid in the differentiation of mycobacterial cultures may prove of value in the study of the bacteriology and epidemiology of tuberculosis infection, they concluded.

## Sanitation Programs and Costs, Wastes and Inspection Service

*A method for computing average costs of common environmental sanitation operations was advanced to the engineering section at one of its sessions. At the same meeting, another speaker urged that sanitation efforts can now be directed toward prevention rather than correction. In an earlier session a procedure for effective composting of city refuse was reported, while another speaker urged conservation of wastes and return of processed sludge to enhance soil fertility. The section also met with the Conference of Municipal Public Health Engineers to hear a panel discuss the trend toward centralized inspection services. Reports from Los Angeles, Philadelphia, and Washington, D. C., were presented.*

#### Safe Use of Sludge Would Help Soil

"We cannot continue to draw on the fertility of our soils and redress the loss by the exclusive use of artificial fertilizers," said LeRoy W. Van Kleeck, B.S., principal sanitary engineer of the Connecticut State Department of Health.

"By proper processing, sanitary engineers can safely return most human wastes back to the soil where they belong," Van Kleeck stated. "To do otherwise is to lose a natural resource." The three principal means for utilizing waste materials in soil fertilization, according to Van Kleeck, are the use of sewage sludge, the use of broad sewage irrigation or sewage farming, and the use of garbage.

Intelligent use of both sludge or any humus material and mineral fertilizer is necessary if either is to have maximum effectiveness for crop production, Van Kleeck said. Sludge is primarily a soil conditioner, and not a balanced food for plants, he pointed out. Sludge furnishes humus which improves soil texture and promotes plant growth. Artificial fertilizers are

needed for most soils to supply plant food. However, exclusive dependence upon commercial fertilizers without consideration for the maintenance of humus content and good soil structure is an unsound practice, he maintained.

Heat-dried, raw activated sludge was recommended by Van Kleeck as best for fertilizer use because it retains most of its organic solids and contains more nitrogen than other sludges. Heat-dried, raw primary sludge also was recommended by Van Kleeck, but he pointed out that it contains less nitrogen. He said digested, dewatered sludges are also valuable as a source of slowly available nitrogen and humus, but precautionary measures, such as those advised by the Connecticut State Department of Health, should be taken in utilizing them.

#### Objections to Sludge

Van Kleeck was of the opinion that because of esthetic dislike and fear of the odor of sludge, its use has not been extensive, although properly digested, dried, and stored primary sludge and heat-dried activated sludge have been established as hygienically safe for application to the soil, and many of the more common



animal manures have more odor than sludge. Well-digested sludge has a tarry or earthy odor which does not carry, he said.

Other reasons sludge has not been more used, Van Kleeck reported, are: its lumpy or chunky physical form which makes it unsatisfactory for lawns, shrubs, and flower beds; and the lack of information among laymen and even agriculturalists as to availability and value. Also, he said, local officials lack the time to promote its use. Because of the large quantities of sludge, the presence of harmful industrial wastes, or other factors, other means of sludge disposal than as fertilizer have been found more practical or economical in many large treatment plants, he stated.

The use of broad irrigation or sewage-farming as a means of sludge disposal is limited because of the large areas of land required, and because of the ever-present health danger if the growing of crops is not restricted to those with the edible portion above ground, or if the crops are not cooked before eating, Van Kleeck said.

Van Kleeck also believes the engineering data are too few to evaluate the use of garbage-composting from the viewpoint of reclamation and soil economy.

### **Weights Sanitation Tasks By Unit Cost Breakdown**

An effort to determine costs of specific missions in sanitation was submitted by Lawrence M. Fisher, Dr.P.H., consultant engineer, because "it is particularly timely" that cost figures be utilized "as a first step" in improving efficiency.

Apart from the question of utilizing funds most effectively, Fisher also evoked the possibility that certain responsibilities for sanitation in commercial establishments might be delegated to private enterprise, "perhaps by developing a joint inspection program with industry, without jeopardizing public health."

A method of determining unit costs, proposed by Fisher, is to determine average time required to inspect an establishment of a given type or the average office time devoted to one establishment in a given program. Either of these average figures may be multiplied by a figure, taken from a table worked out by Fisher, to determine the total time and cost per establishment per year.

Costs per minute are determined by dividing the total appropriation (exclusive of labor or clerical costs) by the minutes of employment of sanitation workers. On this basis, it is calculated that a minute of sanitation services, as published in Sanitation Practices in Local Health Departments, 1951, costs a local health department, on the average of 3½ cents.

Restaurant inspections cost health departments \$10 a year; food processing plants, \$12; retail food stores, less than \$6.50; pasteurization plants, \$225 a year.

### **Would Direct Sanitation Planning at Prevention**

The need for leadership expressed in terms of program planning and administration is the most important basic problem today in public health sanitation work, asserted William C. Gibson, M.P.H., associate professor of public health engineering, School of Public Health, University of Michigan.

He declared that present programs and methods are not attuned to today's needs, pointing out that many of the sanitation activities had their origins in epidemic control. Sanitation efforts today may be directed toward prevention rather than correction of adverse conditions, he said.

Limited budgets, low salaries, and personnel recruitment difficulties are signs that changes are in order, Gibson stated. Since the product of environmental sanitation is recognized as an important one, the defects must be in the methods of administration and procedure, he noted.

### **Problem-Solving Approach**

Gibson offered the problem-solving approach to planning sanitation programs designed to meet the needs of a particular community. This approach involves three steps, he said: (1) determining the actual and potential key problems; (2) motivating those directly concerned to recognize the problems and to accept responsibility; and (3) organization of community resources to help solve the problems.

Gibson urged that the traditional methods of attacking sanitation problems be examined. Pointing out that multiple and repeated inspections of establishments were instigated in the days of epidemic control activities, he recommended reduced emphasis on the inspectional technique and increased emphasis on cooperative methods and the educational and promotional aspects of preventive activity.

Inspection visits should be so conducted that they provide maximum educational value to the operators and employees of the establishments, he remarked. The goal, he declared, is to develop understanding of good sanitation practice and a feeling of responsibility on the part of management and employees for day-to-day high levels of performance.

### **Cooperative Planning**

In directing sanitation efforts toward prevention, cooperative planning with the industrial and occupational groups concerned is essential, he specified.

Greater progress in the promotion of community sanitation programs can be made if the public, individually and collectively, is aware of the problems, he stated.

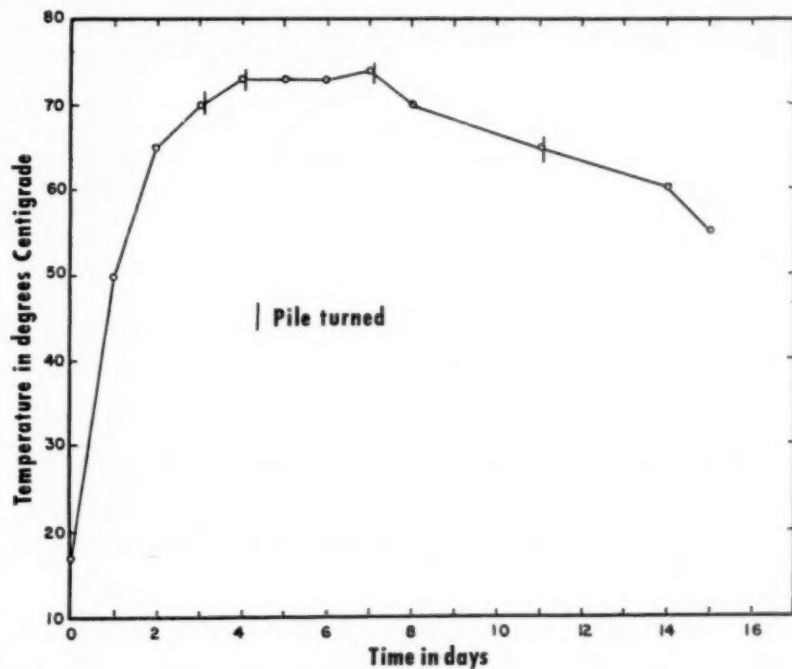
The community approach to sanitation problems is most effective if well planned, focused on key sanitation problems, and promoted by community leaders in addition to staff members of the health agency, Gibson advised. Use of the health council idea may be effective in obtaining organized community effort and leadership, he said.

## COMPOST TESTS

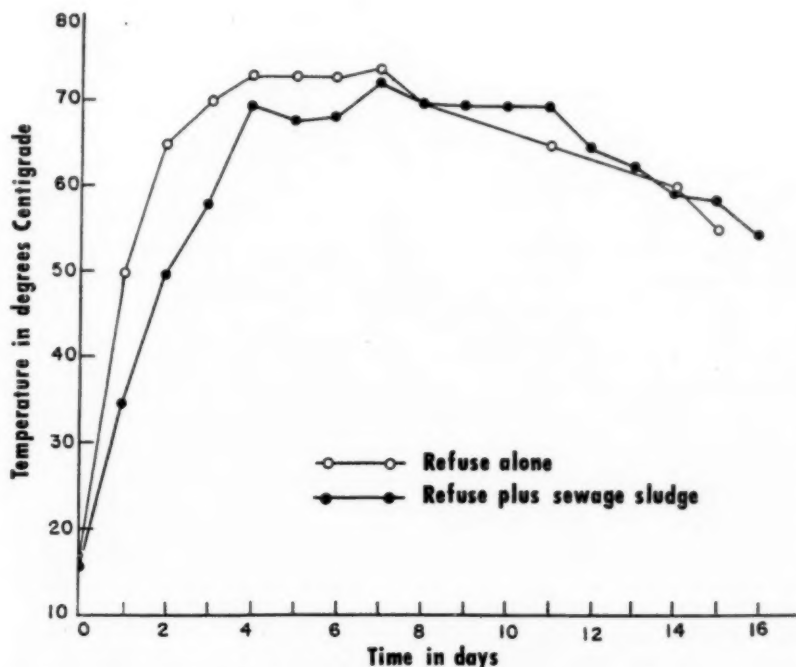
### Two Californians Report On Compost Experiments

Results of experimental composting operations in the United States indicate clearly that a properly conducted operation which meets requirements of reliability, speed, and economic feasibility will also be hygienically and aesthetically acceptable, maintained Clarence G. Golueke, Ph.D., research biologist, sanitary engineering research laboratory, University of California, and Harold B. Gotaas, Sc.D., director of the university's sanitary engineering laboratories.

A simple and reliable procedure for rapid composting of city refuse was developed and studied during a 2-year period by the sanitary engineering research laboratory, the scientists reported, stating that it has proved satisfactory both in pilot plant and field studies using all the organic constituents of municipal refuse alone or in conjunction with sewage sludge and other organic wastes.



Typical temperature curve for a large mass of composting refuse.



Comparison of typical temperature curves for composting wastes.

Summarizing the process, which was described in some detail, they stated the major steps involved grinding, stacking, aeration by turning, and regrinding. The compost was produced by aerobic thermophilic micro-organisms in 10 to 20 days; no inoculums were required, and thermophilic temperatures induced by biological activity in the 70° to 75° range persisted from 3 to 6 days, they reported.

The highest thermal death point of a number of pathogens, parasites, and parasite ova is appreciably lower than the maximum temperatures found inside a composting pile, they pointed out. None, they believe, survive the composting process. In addition, the rapid increase in temperature to 50° C. within 24 hours destroys any fly larvae surviving the grinding operations, and the continued high temperature and turning process hinder further breeding of flies.

Composting organic wastes and using the product as soil conditioner

and fertilizer is a possible practical method for refuse disposal which is relatively free from inherent public health hazards, the researchers commented. They cited several studies of composting practices in Europe, Asia, and Africa which indicate an "apparent absence of health hazards" in properly managed operations.

"The likelihood that a composting method for refuse disposal will be extensively utilized [in the United

States] . . . depends upon the economics of the operation," they said. "The economics of the operation . . . are determined by the cost of production and the commercial value of the finished product." Although information on both these aspects is at present tentative, the prospects that the economic value of composting may reduce the cost of disposing of municipal wastes and sewage sludge are good, they concluded.

right to enjoy benefits is contingent upon the payment of a premium for an insurance period."

Canada, he said, with reference to the broadening of federal grants, has undoubtedly been influenced by the attitudes of both Great Britain and of the United States toward the "degree of public responsibility permissible in the fields of health and welfare." "Something of a middle course," he said, in government-private relationships is exemplified in the British Columbia hospital plan where the governing body, the Insurance Service, collects the premiums and handles the funds necessary for the provision of the hospital service and allocates them to the hospitals for their use.

Premium payments, the commissioner explained, may be made by paying directly to the Insurance Service itself in semiannual installments or through monthly payroll deductions. The "ability to pay" philosophy has been applied with respect to marital status to the British Columbia scheme with flat premium rates currently set at \$27 annually for single persons and \$39 for families, he said.

Detwiller cited a seasonal employment feature of the plan. "All persons who regularly pay their hospital insurance premiums build up an 'insured benefits' period. One month's insured benefits are acquired at the end of each fully paid 6-month insurance period. This builds up, provided all premiums are regularly paid, until a maximum 'insured benefits' period of 3 months is attained at the end of 18 months of premium payment. Full coverage can be obtained during this 'insured benefits' period which will be available during unemployment or when direct payment of premium by the due date is not possible as a result of financial difficulties."

### *The Hospitals' Status*

Although nearly universal hospital coverage has been achieved, the autonomous status of the hospitals has not been affected, Detwiller pointed

## Wider Coverage, Dental Care Issues in Prepayment Plans

*A review of the current problems confronting prepaid medical and dental care plans was presented to the joint session of the medical care and dental health sections and the American School Health Association. In addition, they heard reports on the "Pennsylvania Plan" and the St. Louis Labor Health Institute Plan. How a coal-mining community is meeting its medical care problems through another union plan, and the operation of the British Columbia Hospital Insurance Service were also detailed.*

### **British Columbia Plan Called "Middle of Road"**

The British Columbia Hospital Insurance Service has been successful in providing universal and comprehensive prepaid hospital coverage for the population and in placing the Provincial hospitals on a sound financial basis, stated Lloyd F. Detwiller, M.A., Victoria. As commissioner, he administers the Insurance Service, a branch of the Department of Health and Welfare of the Provincial Government, and is directly responsible to the Minister of Health and Welfare, Detwiller said.

The Insurance Service, organized in 1949 under the Hospital Insurance Act of 1948, is compulsory for all except members of the Canadian Armed Forces, patients of tuberculosis and mental hospitals, inmates

of penitentiaries, members of the Christian Science Church, and certain other special groups, he stated. "Eighty-five percent of all persons hospitalized have received coverage under the system during the first 4 years of operation," he said, adding that the remaining percentage is accounted for by exempted persons or by transients.

The hospital insurance receives support from the medical profession, the hospitals, the Government, and the people, he said.

### *A Middle Course*

"The concept of public responsibility appears to be gaining acceptance in Canada," he continued. "This trend has not altogether relieved the individual of his responsibility in British Columbia where, although all persons are required to become members of the insurance scheme, the



out. They are still independent societies, operated at the community level by boards of directors who control the hospital's operation through the administrator, in exactly the same way as the majority of general hospitals operate in other provinces and in the United States. The one main difference is establishment of the hospital's all-inclusive per diem rate by the Hospital Insurance Service, in accordance with the financial resources of the Hospital Insurance Fund. Once the per diem rate is established, he added, every board of directors determines how the hospital shall expend its funds.

Since the plan's inception, Detwiller remarked, the Provincial Government has assisted communities by financing a progressive program of hospital construction. Communities constructing hospitals have received at least one-third and in most cases over 50 percent, of the cost from the Provincial Government. Because of this program, many new hospitals have been built, bringing the bed ratio from 5.00 per 1,000 in 1949 to 5.64 by January 1, 1953.

More than 1 million hospital accounts, involving the expenditure of more than \$80 million, have been paid by the Insurance Service, Detwiller added, noting that an account as high as \$10,782.35 has been paid for a single patient hospitalized almost continuously more than 2½ years.

## Wider Coverage, Benefits Termed Current Issues

Expansion in number of persons covered and expansion in the range of services were termed the two central research and discussion issues in prepaid medical care today by Odin W. Anderson, Ph.D., research director, Health Information Foundation, New York City, and an adjunct associate professor of New York University.

Although the principle of expanded coverage is not an issue, Anderson said, it is conceivable that if pre-

payment plans become more aggressive in their enrollment of farmers, other self-employed persons, and persons from the aged and low-income groups, "there may be a rising fear that prepayment is overextending itself."

With regard to an expanded scope of benefits, Anderson said, "There are disagreements as to 'insurability' of certain services, particularly on a fee-for-service basis of paying physicians. The acceptance of the prepayment principle is being refined to include only so-called insurable services. Blue Cross prefers to offer the full range of hospital services on a prepayment basis. Blue Shield would prefer to limit its offering to surgery and in-hospital physicians' services. Private insurance appears willing to offer a wide-gauged contract for a whole range of services provided it can be sold and supported by adequate underwriting controls, and group practice prepayment plans offer quite comprehensive services on a salaried physician arrangement."

## Wider Benefits

The pressures for expansion in benefits are evident, Anderson said, in the introduction of major medical riders to cover costs of all services for illnesses exceeding a certain minimum cost; in the persistent demands from vocal groups for comprehensive services, however defined; in the so-called dread disease riders; and the existence of group practice prepayment plans. On the subject of expanded coverage, he said, there is persistent discussion of government subsidy for low-income groups to be enrolled in voluntary plans, including aged and retired persons; persistent although sporadic efforts in nongroup enrollment on the part of Blue Cross and Blue Shield; and the great increase in individual coverage sold by private insurance.

Anderson, in citing 8 research projects on the range of benefits and 6 on the scope of coverage, indicated several other areas needing research, such as the evaluation of nongroup experience, analysis of the problem of low-income groups, and study of

the solvent fee-for-service plans providing complete physicians' services.

These projects, Anderson indicated, are designed to implement and test the assumption that present methods of financing and organizing personal health services are capable of solving adequately the recognized problems of medical economics—exclusive of the recipients of public assistance.

## Dental Care Habits Called Main Prepayment Obstacle

Public complacency about dental disease was termed one of the main obstacles to prepayment plans for dental care by W. Philip Phair, D.D.S., M.P.H., secretary of the Council on Dental Health, American Dental Association, Chicago.

It is extremely difficult, he indicated, to convince the public that dentures are not an inevitable part of growing old, but the result of neglect.

## Backlog and Maintenance

Early and regular treatment, Phair pointed out, ties in with two requisites for the financial success of a prepayment plan. Subscribers should come into a plan with accumulated dental work done, he said, and they should remain on a "maintenance" basis—each new cavity filled before it becomes large and disease adequately treated to avert extractions and expensive appliances.

Cost of initial care for accumulated dental needs have been estimated at \$80 for adults and \$20 for children, Phair said, while maintenance care is estimated at \$16 a year for adults and \$12 for children.

"The difference between \$80 initially and \$16 annually accentuates the problem of beginning prepayment dental care programs without some provision for caring for the accumulated dental needs," he stated. Techniques for motivating or requiring patients to maintain their mouths in a healthy condition must also be developed, he said.

Phair named as other problems the need for a special administrative

structure and underwriting funds, the difficulty in predicting how many subscribers will seek benefits, and the question of willingness to pay premiums for dental care in addition to prepaid medical care.

"Regarding the feasibility of financing dental care by a prepayment plan," Phair stated that the question cannot be answered completely until additional facts are obtained through actual experience.

To this end, Phair said, more pilot or experimental studies should be undertaken, and promotional efforts for such studies should be forthcoming from professional dental and public health groups and from other groups interested in health. He also called for the collection, assembly, and distribution of background data.

### *ADA Principles*

Phair listed nine principles adopted by the American Dental Association in 1953 to assist dental societies in evaluating the desirability, practicability, and soundness of specific plans. In brief these principles are:

The plan, designed to provide a high quality of dental treatment, should be developed, maintained, and promoted with the advice of authorized representatives of the local or State dental society. Restrictions, dictated by local conditions or lack of facilities, should be determined and regulated by authorized dentists. The dentist who serves the patient must have complete freedom and responsibility in recommending treatment. He must have the right to accept patients, and provision should be made for direct payment to him, with fees determined by representatives he authorizes. Similarly, the patient must be free to choose his own dentist.

All rules and policies related to the dental aspects of the plan, including examination, diagnosis, treatment, prevention, and professional education, should be determined by officially designated representatives of the dental profession. The plan should designate explicitly both the type and amount of service and the

conditions under which it will be provided so that both the patient and the dentist will know exactly the extent of their participation in the program. Sound and efficient business practices should be used in the management of the plan to assure low administrative cost.

### **Dental Surgery Included In Pennsylvania Plan**

The "Pennsylvania plan" for benefits in Blue Shield includes oral surgery performed by participating dental surgeons, reported John P. Looby, D.D.S., chairman of the Hospital Dental Service Committee, Pennsylvania State Dental Society, and member of the board of directors of the Medical Service Association of Pennsylvania.

The provision for oral surgery has been available to Blue Shield subscribers in Pennsylvania since 1949, when the State legislature passed an enabling act allowing dentists to receive payment for services to hospital patients, Looby explained.

Looby listed the four major types of benefits available to Blue Shield subscribers in Pennsylvania. These are group surgical agreements, group medical-surgical agreements, non-group agreements, and master "steel" agreements, the last available to steel workers and their families.

Dental services available under the first three types of contracts include surgical treatment of disease, injuries, fractures, and dislocations of the jaw, Looby said. The plan, he explained, does not include care of teeth nor extractions except impacted teeth.

The master steel agreement does not include general dental surgery, but dental surgeons are paid for services in reduction of jaw fractures and dislocations, Looby said. The dental benefits of this contract were restricted, at the request of the CIO and steel corporations, to conform with Blue Shield contracts in all parts of the country, he explained. Not all Blue Shield organizations, he

said, permit dental participation.

Looby concluded from the Pennsylvania experience that the participation of dentists in a medical service association plan is quite acceptable. "Dentistry has been participating in the period of greatest growth of Blue Shield in Pennsylvania—from 556,693 subscribers in 1949 to over 2,500,000 at the present time, and it is my feeling that the relationship such as we have in Pennsylvania could be carried out in other States for the benefit of subscribers," he said.

### **Union's Prepayment Plan Includes Dental Care**

Inclusion of dental care as part of a prepayment medical care program and utilizing dentists in private practice is not only possible and practical, but highly desirable, declared John O. McNeel, M.D., medical director of the St. Louis Labor Health Institute.

Stressing that "good medical care means good dental care," McNeel cited the experience of the St. Louis Labor Health Institute as evidence that such a program can be practical. This plan was organized in 1945 by the International Teamsters Union, Local No. 688, of St. Louis for the benefit of eligible members and their dependents—15,000 persons.

In the plan, McNeel observed, the department of dentistry has been accepted as a medical specialty, and the dentists attend the staff meetings and participate in the administrative conferences on the same basis as the physicians.

### *Complete Care Stressed*

Full dental care is stressed, McNeel indicated. In addition to emergency dentistry, the member is encouraged to make an appointment for complete dental X-rays and a thorough clinical examination of the teeth and the buccal cavity. If the member has not been seen previously in the medical center, an appoint-

## LABOR PLANS

ment is made for a complete physical examination.

Subsequent appointments are made for complete prophylaxis, fillings, extractions, reconstruction of bridges or dentures, or other services, McNeel said. On completion, the patient is instructed on proper prophylaxis or other personal care required.

All types of dental work are prepaid under the plan, except that the member must pay the laboratory fee for bridges and partial or full dentures, McNeel said. He must also assume the expense for orthodontic treatment, but arrangements are made for such care with qualified specialists in the community, he stated.

Ten dentists, who maintain private practice, are employed on a part-time schedule and are paid a flat hourly rate, he said. Each dentist is also assigned a dental assistant.

The system of part-time dentists has been so satisfactory, McNeel indicated, that there has been relatively little turnover of dental personnel since the initiation of the dental care department.

A fee-for-service system of payment would present problems in arriving at a fee schedule and would be prohibitively expensive budget-wise, McNeel pointed out. The flat hourly fee places no premium on the amount of work done or the number of patients seen, he said. Physicians and dentists perform at widely varying rates, and requiring dentists to see the same number of patients in a given hourly schedule might cause a decline in the quality of care, he maintained.

Private dental laboratories are used by the plan, McNeel said, since the employment of technicians skilled in special procedures would be prohibitively costly and the cost of equipping and maintenance of a dental laboratory would be sizable.

### *68-Percent Use*

Of the approximately 15,000 persons eligible for dental service, 9,389 availed themselves of this service at

least once during 1952, a utilization rate of 68 percent, McNeel said.

The total cost of the dental department in 1952 was \$129,299, McNeel concluded. Of this sum, \$110,286 was paid by the Labor Health Institute and \$19,013 was paid by the participant for outside laboratory fees. The cost per dental participant per year was \$9.39, he said, but the cost per dental patient per year was \$13.77, making the cost per prepayment family \$2.35 per month.

### **Utah Labor Health Plan Cuts Hospital Census**

A labor health plan begun early in 1952 is adequately meeting the medical care problems of a coal-mining community in southern Utah, according to William A. Dorsey, M.D., area medical administrator for the United Mine Workers of America Welfare and Retirement Fund, and Ada Kruger, R.N., B.S., assistant to the administrator.

The local labor unions requested a prepaid home and office medical care program in which the miners would have a voice in determining how their money was spent, they reported. To this end, a nonprofit corporation was formed to receive and administer the funds derived from payroll deductions, they stated. Services provided by the plan supplement the hospitalization and special services of the UMWA Welfare and Retirement Fund.

The plan is open to everyone in the community and presently includes more than 70 percent of the community's 7,000 population, they noted.

### *Patient Management*

Three general practitioners formed the nucleus of the plan's medical staff in order to preserve "the concept of the general practitioner as captain of the medical team," they specified. An internist, a pediatrician, an obstetrician-gynecologist, and a radiologist have been added.

Although not a member of the medical group, the surgeon serving as industrial physician for the mining companies works closely with the plan's physicians and acts as chief of surgery and consultant on all surgical cases, they added.

### *Hospital Utilization*

Before the program's start, the local hospital, with 5 beds per 1,000 population, consistently operated at near capacity, but during the program's first year, the average hospital census, including industrial injuries, was 2.2 per 1,000 population, Dorsey and Kruger reported.

Data from a nearby mining town reveal that annual admissions per 1,000 persons are 197 as contrasted with 133 in the community in which the plan operates, they also pointed out. Further, the average hospital census, excluding industrial cases, was 5.3 beds per 1,000 in the nearby community, but 1.9 under the plan, they stated, and the annual number of days in the hospital per 1,000 population was 1,950 as compared with 695 under the plan.

### *Critical Analysis*

Dorsey and Kruger, however, did not consider these findings, representing only 1 year's experience, conclusive. "Perhaps they indicate a need for a more critical analysis of general hospital utilization before large expenditures are made in order to provide 4, 5, or 6 beds per 1,000 population . . .," they said.

They maintained that the labor health program avoids two principal causes of overutilization of hospitals: provision of services only to hospitalized patients, and inadequate diagnostic facilities in the physician's office.

The average annual per capita cost of the plan is \$58.40, or \$216 per family, for the 94 percent of the plan's membership who are also covered by the UMWA Welfare and Retirement Fund, "a cost that does not appear to be prohibitive for the rather wide range of services provided," they stated.



## Medical and Nursing Care In Institution Programs

*The effectiveness of a comprehensive care and teaching program of a medical center—designed as a “laboratory in patient management”—was evaluated in a report presented to the medical care section. The characteristics of patients in nursing care institutions in Maryland and the continuity of nursing care provided by properly managed referral systems were topics of papers read before the medical care and public health nursing sections and the Conference for Health Council Work.*

### Reports on Characteristics Of Institutional Patients

Patients in nursing homes and other institutions providing long-term nursing care in Maryland are, in general, very aged, predominantly disabled, and suffering chronic illnesses, but within this general pattern persistent differences exist among the five types of institutions surveyed.

This generalization was made by Dean W. Roberts, M.D., director of the Commission on Chronic Illness, in his summary of data gathered in a pilot survey, on the characteristics of patients in proprietary and nonprofit nursing homes, homes for the aged, chronic disease hospitals, and city and county almshouses. Also included in the survey were children's convalescent homes, patients in general hospitals, and chronically ill patients at home, he noted.

The Commission on Chronic Illness, with the participation of a number of States and the Public Health Service, is making a survey of the characteristics and care of patients receiving long-term nursing care in institutions in the hope that the data will help to determine what roles need to be played by the various institutions to meet adequately the medical and nursing care requirements of the aged chronic sick, he explained.

### Patient Characteristics

Among the findings reported by Roberts were those listed below. The likenesses and differences among the various institutions “carry crucial implications for their place in the medical care of people,” he said.

**Physical and Mental Status:** The greatest prevalence of disabilities among patients is found in the chronic disease hospitals and proprietary nursing homes, followed closely by nonprofit nursing homes; a much lesser extent of disability exists among patients in homes for the aged, and the least, in almshouses.

**Diagnosis:** Two out of 5 patients in the proprietary nursing homes suffer primarily from heart and other circulatory diseases or from paralytic stroke. Senility, an ill-defined term, connoting physical and mental infirmities incident to the degenerative processes of old age, is present in another 1 out of 5.

**Age:** One in 4 patients in the proprietary nursing homes is 85 years old or over; 1 in 5, in the homes for the aged; 1 in 6, in the nonprofit nursing homes; and 1 in 10, in the chronic disease hospitals and almshouses.

**Sex:** Women predominate very heavily in the nursing homes and the homes for the aged, whereas men are in the majority in the almshouses and chronic disease hospitals.

**Marital Status:** Widowed patients, which of course make up a large percentage of the patients in all the institutions, are more frequent—62 percent—among those in the proprietary nursing homes—than in the other types of institutions. Only 32 percent of the almshouse residents are widowed.

### Nurse Referrals Provide Continuity of Care

Continuity of nursing care results from referral of discharged hospital patients to community nursing agencies for supplementary service, Ruth M. Farrisey, R.N., M.P.H., public health nursing supervisor of the Massachusetts General Hospital, told the joint session of the medical care and public health nursing sections and the Conference for Health Council Work.

At the Massachusetts General Hospital, Farrisey said, 48 percent of the referrals are made to insure continuity of medication, and the remaining 52 percent are requests for supportive nursing care, specific nursing treatments, or simple physical medicine routines.

From 73 to 78 percent of the hospital's referrals are made to public health nursing agencies giving bedside nursing care; 20 to 25 percent are sent to nursing, convalescent, and medical foster homes; and the remaining 2 to 3 percent go to the other hospitals for the chronically ill, terminal care facilities, and to industrial clinics, she related.

### Boon to Hospital Nurse

A community interagency referral plan, Farrisey thinks, is a boon to the hospital nurse when patients are discharged before instruction is complete, when the patient's condition necessitates further bedside care, or when the patient's family cannot meet the patient's posthospital requirements.

The hospital administrator, too, in these days of early discharge and rapid bed turnover, finds the plan

## TEACHING PROGRAMS

valuable in giving the patient supplementary service. Further, Farrisey continued, it serves the purpose of keeping all members of the team attuned to their responsibility for patient and family education.

Schools of nursing and medical schools find it "an excellent aid in teaching neophyte physicians and nurses something of their extended responsibilities in today's plans for the most comprehensive patient care possible," she said, adding that all kinds profit by the experience of nurses who have had prior contact with their patients. The community public health nurse, she said, finds in the plan an opportunity for community service.

The Massachusetts General Hospital places the responsibility for continuity of nursing service upon the head nurse and the service physician, Farrisey said. The head nurse, she explained, is in the most strategic position to see and know the patient.

### *Head Nurse Responsibility*

To those who feel that this will be just another burden added to the already heavy load of the head nurse, Farrisey suggests that an inquiry into other functions of the nurse will show that this job is more realistically in line with her training and aptitude. The ability to communicate with the nurse working on the local scene so that the patients will receive continuous care and guidance after discharge is one of the finest satisfactions in modern hospital nursing, Farrisey declared.

In summary, Farrisey laid down these principles to govern referral plans: Such plans must be prepared with the full knowledge and agreement of participating agencies. They should be administered by nurses. A plan necessitates considerable education of professional staffs and requires sharing advancements in medical and clinical knowledge with participating authorities. The participating agencies must remain cognizant of their responsibilities for patient education and family health to the end that improvement

in medical and nursing service as well as public relations shall ensue.

### **Medical Center Coordinates Teaching and Patient Care**

The comprehensive care and teaching program of the New York Hospital-Cornell University Medical Center has been effective in the coordination of teaching and patient care in medicine and pediatrics, according to the program's director, George G. Reader, M.D., associate professor of medicine, Cornell University Medical College.

Those in charge of adult patients have learned what pediatricians have long recognized—the importance of the patient's family and of preventive medicine in the everyday management of patients, he said. Pediatricians, in turn, "have gained from being exposed to the broader concept of medical care involved in dealing with people at all age levels."

The program was designed in 1951 as a laboratory course in patient management to improve the teaching of undergraduate medical students and to give them an opportunity to develop significant doctor-patient relationships with patients who need more than occasional, symptomatic therapy, Reader continued. It has proved a "cohesive and integrating force in the life of the center and has given . . . patients a centralized, continuous, humane kind of care that may be tentatively considered a distinct improvement in medical practice."

Physician, nurse, social worker, and medical student have a new understanding and respect for the contributions made by each and "a new concept of medical care," the speaker stated. This, he said, was brought about by raising the nurse and social worker to full partnership with the physician in directing patient management.

### *Selection of Patients*

An important aim of the program is to develop judgment in the selec-

tion of patients, the director said. All patients in the medical and pediatrics clinics, although eligible for comprehensive care, do not need detailed study of home, family, and life situations. He reported that at present student physicians are assigned to 76 families, who have been selected because one member has an illness requiring continued medical supervision and because the family includes young children, lives within a reasonable distance of the hospital, and has no overwhelmingly complex social problems.

Although home care experience is considered an integral part of teaching medical students, large numbers of home care patients have not been assigned to them because the amount of traveling involved might be a detriment to their other learning experiences, Reader stated. Family care patients have first priority for admission to the home care service of the hospital, but they are accepted only if initial examination can be carried out at the hospital and after investigation by a social worker. Standards of care are maintained and coordination achieved through frequent staff meetings.

Administration of the comprehensive care program is in the hands of a nondepartmental organization responsible directly to the medical center's joint administration board.

### **Extramural Program Cited As Educational Opportunity**

Noting that the extramural program in the field of medicine is a relatively new venture, Henry J. Bakst, M.D., professor and chairman of the department of preventive medicine, Boston University School of Medicine, and director of home medical and outpatient services, Massachusetts Memorial Hospitals, Boston, declared that such programs have a specific role in both medical education and medical care.

Discussing some of the advances in the teaching of preventive medicine before the Conference of Professors

of Preventive Medicine, Bakst reviewed the special areas of emphasis with which home care programs are concerned. "Home care programs, as they provide a structural framework for medical education, deal with a number of considerations, which, it is hoped, will improve the understanding of illness as a medical-social problem," he said.

Bakst listed four interdependent areas in which extramural programs are generally involved—the community laboratory, social science integration, interdisciplinary teaching, and comprehensive medical care—and discussed each in relation to the teaching of preventive medicine.

"In a broad sense," he remarked, "the community in which a home care program operates is a laboratory in which the nature and incidence of illness and the role of the physician as well as that of official and voluntary agencies may be studied in relation to the problems of health maintenance and disease prevention."

#### *Man as a Social Being*

In discussing the important relation of the social sciences to medicine, Bakst noted that the extramural program directs the student's attention to a consideration of man as a unit in society. "The extramural program is concerned with the influence of social relationship on individual and group responses to pathological processes," he stated. "The student is confronted with situations in which human beings must be dealt with in relation to each other and to the community. He learns that the nature of medical practice is a reflection of the society of which it is a part and that cultural backgrounds and ethnic origins may seriously influence an effective approach to the management of the patient."

The nature of home care programs, with the patient as the central focus, he continued, requires the careful integration not only of specialties within medicine but also of related disciplines, such as nursing and social service. As medical, nursing, and

social work students strive toward their common objective—patient care—they soon recognize "that the complex problems of many patients cannot be undertaken or solved by the physician alone," the professor maintained. "The utilization and mobilization of community organizations and facilities for the benefit of patient care thus become an essential activity of this educational experience," he said.

Bakst indicated that three factors have led to the development of what has been termed comprehensive medical care: the implications of illness

and disability in the family constellation, the need to explore the physical, emotional, sociological, and medical aspects of illness, and the importance of the prevention as well as the treatment of disease. "From an educational point of view, such a concept requires a program which provides continuous care of the patient in all the various circumstances of sickness and health and which offers an opportunity to demonstrate a more comprehensive view of health services than is usually possible within the walls of a hospital," he stated.

## School Health Research Trends And Service Studies

*The necessity for tuberculin testing of school children and for early testing to diagnose hearing defects, the lack of adequate health information among both students and adults, mental hygiene in the classroom, and problems of behavior-centered sex education were discussed at meetings of the American School Health Association. A joint session of the Association with the food and nutrition, maternal and child health, and statistics sections of the APHA was told of the importance of accurate records of children's growth and the proper interpretation of such records in the early recognition of nutritional deficiencies and disease. The school health and maternal and child health sections heard reports on screening tests of school children for hearing loss and on child safety education.*

### Tuberculin Testing Is Urged In School Health Programs

No tuberculosis control program in any community can be considered first class unless it reaches school children and members of school personnel periodically, asserted William E. Ayling, M.D., health director of the Syracuse, N. Y., public schools, in a talk before the American School Health Association.

Tuberculosis case-finding programs in the schools are good health

education, he said. They spread the knowledge of the control of tuberculosis; they find cases early, thereby preventing disability in the most productive years of life; they also avoid the expense of long treatment; and they protect the public health by preventing spread of infection, he reasoned.

#### *Observe Under 15 Group*

Ayling maintained that tuberculin testing of school children and X-raying the reactors was a case-



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finding device of greater practical value than mass X-ray surveys of school children. He stressed the importance of followup and careful supervision of every case found.

"It is a mistake to look for tuberculosis only in persons over age 15," Ayling asserted. "In the last 5 years, of 39 cases of active tuberculosis found by us or other local agencies, among school children, 31 were age 15 or under. The normal-appearing child who reacts to tuberculin today may be the contagious adult consumptive of tomorrow if the source of his infection is not found and broken, and he, himself, is not kept under close surveillance.

"Neglect to inform the children of today concerning tuberculosis means an adult population ignorant in this regard tomorrow," he said.

### *BCG Vaccination*

Ayling opposed BCG vaccination in school health programs in this country. He quoted Dr. Jay Arthur Myer's statement that BCG sensitizes tissues to tuberculin and thus nullifies subsequent use of the tuberculin test. He also quoted Dr. W. J. Peabody as saying that by employing a BCG program universally, one of the most valuable diagnostic weapons, the tuberculin test, would be lost, for all tests would then be positive. The presence of a positive test, according to Peabody, Ayling said, indicates only allergy and should not be construed as immunity, for by contrast it comprises a fundamental requisite for, rather than against, tuberculosis.

It was a mistake, Ayling said, to give BCG to school children in a 1949 testing program in two of the Syracuse city schools because it upset the regular case-finding program which depended on detection of positive reactors to screen out children needing chest X-rays. The test was a time-consuming task and proved a disagreeable one as far as the children were concerned. Followup, he said, has shown the immunity to be only temporary in many who had taken BCG.

Although there are now definite

signs that the battle against tuberculosis is reaching its final stages, Ayling concluded, everything points to the need for stepping up case-finding programs in order to reach the goal more quickly.

### *Expenses Smaller*

"Case-finding programs in schools definitely can help," he said, in pointing to the 19-year-old Syracuse school program, in which the percentage of positive reactors has been reduced from 35 to 30. "Now it is only necessary to X-ray 3 out of 100 tested, which means a great saving in time and expenses involved in X-raying many to find possible infection in so few."

### **Believes Early Testing Is Best Hearing Safeguard**

Hearing and speech should be tested long before a child enters school, Edmund Prince Fowler, M.D., stressed at the meeting of the American School Health Association. Dr. Fowler is chairman of the Central Bureau of Research and chairman of the Board of Trustees of the Research Fund, American Otological Society, New York City. Audiometers and speech and hearing centers alone cannot solve the problems of the hard-of-hearing child, he contended.

"We should not overstress the efficacy of early diagnosis and treatment in children insofar as restoring the hearing is concerned," he cautioned. "The important thing is to make a diagnosis and prognosis and to prescribe treatment only when it is indicated. . . . Not enough emphasis has been given to the importance of early testing for the purpose of diagnosis and of finding out if the child needs assistance to function properly in his classes with normal hearing children."

### *Psychological Effects*

There are at least 3 million subnormal hearing and hearless children in the United States, in Fow-

ler's estimation, whose hearing should be carefully examined.

"If hearing and speech are not sufficient to enable a child to keep pace with his classmates, severe psychological repercussions regularly occur, not only in the child but frequently also in those with whom he comes in contact," he said, adding that the hearing of all students should be qualitatively examined at least at the beginning of each of the fall terms. Students should be tested to determine if their hearing appears subnormal or has changed from an earlier test. Every physician attending children should be instructed in methods of testing hearing with reasonable accuracy.

Although these concepts have been generally accepted and included to some extent in the laws of more than 30 States, some with moderate success, most laws are "without teeth," Fowler said. "The results insofar as the prevention of deafness or the conservation of hearing is concerned have been small indeed."

### *The Progress Lag*

Initial testing has been too long delayed, he said. Audiometers are being used only a few times and then neglected. More than \$1 million is tied up in obsolete equipment. But more equipment becomes faulty in calibration than in obsolescence. "What we mostly need is more and more interested and trained personnel," Fowler indicated.

Appropriation of insufficient money to hire personnel and the idea that elaborate and expensive hearing centers are necessary for the detection of deafness and the conservation of hearing are factors responsible for the lag in overcoming the problem of deafness among school children, Fowler believes. He cited as more important factors, however, a lack of a continuing and sufficient interest; failure to provide information to all parents, physicians, teachers, and health officers; a lack of furnishing a simple and ready means for the early detection of deafness and for obtaining a diagnosis, treatment, and management for

a child with deficient hearing or speech.

### Parent Education

Fowler maintained that a general awareness of the problem and a willingness to cooperate at this time could go far in solving the acute problems of early detection and conservation of hearing, and pave the way for efficient checkups and otological examinations, and eventually, maybe, ideal facilities.

Symptoms parents should watch for in a little child, he said, include failure to notice moderately loud speech and sounds, delayed acquisition of proper response to speech, failure to hum simple tunes frequently heard, failure to listen to loud music, and a lack of muscular reaction to sudden loud noises like barking dogs, backfiring automobiles, and police sirens.

Fowler suggested that much can be done in educating parents of deafened children so that they may help promote in them the development of speech and language. Early enrollment in a good nursery school is imperative, he said, and if possible the school should be one for hard-of-hearing children but not one for children with major behavior problems. Public schools, he felt, were not as remiss about hearing tests as others, but he urged that all schools be compelled to obey State laws.

### Classrooms Must Provide Healthful Climates

"Good mental health is a positive state of well-feeling which so completely encompasses the individual that it spills over and pervades his environment, making the neighborhood of that person a good place in which to be," Helen Cook Newman, M.D., school physician for the University of Chicago Laboratory School, told the American School Health Association.

"If a child can be reasonably at home in his classroom and feels that he can count on the teacher and her

plan, one source of preoccupation is removed, making it possible to direct greater attention to the business of the schoolroom," she said. "Freedom to choose within limits defined by the degree of maturity makes a situation favorable for learning."

Concern with the child's growth during the school years, Newman said, is widespread today. "For this growth—physical, emotional, and intellectual—the proper ingredients are needed in the secondary schools as well as in the early grades," she added. "The school performs a positive mental health function when the fundamental learning skills are well taught," Newman continued, pointing out that disillusionment and discouragement occur in all children when their expectations to learn specific skills at definite times is not recognized. She emphasized that a most important school function is to provide learning opportunities to help the child satisfy his need for preservation and enhancement of the self in ways acceptable to society.

### Teacher and Child

Schools must face honestly the problem of supplying classroom teachers who can reasonably be expected to cooperate in promoting the mental health of their pupils, Newman pointed out. "Ironically, realization of the importance of teachers to the emotional health of children grows at a time when the shortage of teachers has reached alarming proportions."

The kindergarten is a necessity in the preschool years if education is to be successful, Newman related, and quoted a rhyme "by an author not often quoted in scientific journals," which runs—

*Kiss of the sun for pardon  
Song of the birds for mirth  
We are nearer to God in a garden  
Than anywhere else upon earth.*

In the kindergarten, she said, the role of the sun is played by the teacher. "From her presence radiates the warmth and light so essential to the well-being and growth of

her charges. Let a cloud pass over the teacher's face, and the children will withdraw into themselves. All through the school years, teachers are making or breaking classrooms. Perhaps the window-breaking in schools . . . is due in part to a desire of youth to retaliate. Altman has estimated that in New York City 40,000 children are exposed to psychotic teachers each year."

Mental hygiene in the classroom today, Newman pointed out, can look to some encouraging developments in teacher procurement and stability: Periodic examinations of teachers offer hope for the prevention of physical and emotional illness; teacher training has improved with greater knowledge in the fields of educational psychology and child development; the composition of the teaching profession is changing to include more men and more women with grown children; psychologists, medical personnel, and social workers are accepted as part of the educational team; and there is a growing appreciation on the part of other disciplines, especially psychiatry, of the importance of schools in case finding and promotion of therapy, which will ultimately lead to a decrease in juvenile problems and improvement in the mental hygiene of the adult population.

### Outlines Problems in Field Of Sex Education

Although there is considerable controversy regarding certain aspects of the problem of behavior-centered sex education, there appears to be strong agreement among leadership groups in the field of sex education and family life education on at least five points, reported Mabel E. Rugen, Ph.D., professor of health education, University of Michigan.

These points, she said, in outlining the problem before the American School Health Association are: the importance of the family as the basic unit in American society; the importance of relating sex behavior to

"acceptable" standards in the culture; the importance of respect for personality and unselfish attitudes in human relations; the recognition of emotional maturity as an important aspect of the problem; the recognition of the importance of example as an influence in guiding adolescents toward desirable behavior.

Rugen also remarked that the importance of considering sex as a factor in human happiness and personality has been stressed, and emphasis has been placed on the importance of building wholesome attitudes and good human relationships. "Conduct has been given equal if not more emphasis than knowledge," she stated.

These observations are based on consultation with personnel of national associations and other experts and a review of about 75 articles, studies, and reports, Rugen said. Most of the references, she explained, dealt with opinion and general discussion rather than results of studies.

## Finds Public Fails Quiz On Health Knowledge

Few individuals are sufficiently informed in all of the various areas of health knowledge to be able to act wisely for their own personal needs, according to tests given hundreds of persons during the past 20 years. For example, only about one-half of those tested knew enough about nutrition to enable them to select a balanced meal in a cafeteria.

This was one of the general findings included in a summary of data on health knowledge of the public presented to the American School Health Association by H. F. Kilander, Ph.D., associate professor of education and coordinator of health education, School of Education, New York University.

The summary covers findings and conclusions from studies made by many educators, including himself, Kilander said. He mentioned gen-

eral health knowledge tests and single health area tests (such as those on first aid, tuberculosis, nutrition, personal health, and mental health) as two types used. The groups tested, he specified, included high school and college students and adults from various walks of life.

Other findings and observations reported by the educator included:

1. A slight but steady improvement in the level of health information held by students and adults, although the change has not been equal in each of the areas of health knowledge. Many individuals still hold misconceptions about nutrition, weight reducing, prenatal influences, mental health, and first aid procedures.

2. Similar levels of information in different parts of the United States, indicating that informational needs for various parts of the country are more alike than different and that the health education programs of different regions need not vary widely.

3. A wider range of the information level within a given group than among groups or areas, suggesting a need for expert teaching, small classes, and individual health counseling and guidance.

4. A continuous rise in the level of health information for successive grades in school, with the rise tending to level off by the senior year in high school.

5. In general, a positive relationship between health information and health practices; that is, better informed individuals tend to have better health practices.

## Hearing Loss Screening Techniques Compared

In a comparative study of three methods used in screening school children for hearing loss, pure tone techniques proved significantly better than the group fading numbers test.

This was the conclusion of Alfred Yankauer, M.D., M.P.H., director of the bureau of maternal and child

health services, New York State Department of Health, Margaret L. Geyer, M.S., audiologist, City Board of Education, Rochester, N. Y., and Helen C. Chase, M.S., biostatistician, New York State Department of Health, who reported on the study.

They pointed out, however, that because of variations in techniques, standards, and interpretations of standards, values which measure or compare screening procedures are not easily fixed.

According to their report, the 3 screening methods were a group phonographic fading numbers test, a group pure tone test, and an individual pure tone sweep check test. The study group was composed of 2,404 third through seventh grade pupils of 9 public schools in Rochester, N. Y. All children who failed either of the group screening tests twice or the sweep check once were given a pure tone threshold test, and all children with verified hearing loss were seen by an otologist.

## Study Findings

"As a result of the screening combination, 118 children (4.9 percent) were found to have a verified hearing loss, but no one of the tests selected all 118," Yankauer and his associates stated. The group phonograph screening detected 39; the group pure tone procedure, 82; and the individual sweep check, 112.

They also reported that of the 118 children with verified hearing loss, medical or educational recommendations were made for 74 (64 percent), the group phonograph screening procedure selecting 31, the group pure tone screening procedure, 53, and the individual sweep check procedure, 71.

Although the individual sweep check was the best case-finding procedure of the 3, it also selected more children with no hearing loss than either of the 2 group tests, they noted, specifying, however, that the absolute number of children overselected by the sweep check was not significantly in excess of the number overselected by either of the group tests. Overselection with its inherent overuse of personnel time must



be balanced against superiority in selecting significant cases, the investigators remarked.

Also to be considered, they indicated, is the time required for the various procedures. In this study, the average time per child was 1.4 minutes for the group phonograph method, 0.9 minutes for the group pure tone, and 1.9 minutes for the individual sweep check.

### Forecasting Growth With Iowa's Charts

Nutritional deficiencies and disease would have more chance of early recognition if an accurate record of a child's growth were kept and properly interpreted, Robert L. Jackson, M.D., professor of pediatrics, and Helen G. Kelly, M.S., research associate, Department of Pediatrics, State University of Iowa, told a joint meeting with the American School Health Association.

Continued observation of height and weight values may also give a good index to successful therapy, they noted. With nearly every disease process, there is some impairment of growth, they said. Graphs showing the norms of growth for infants and children expedite evaluation of therapy for all observers, but are necessary for the inexperienced observer, they explained.

Height-age and weight-age charts based on 13,500 height and 11,000 weight observations of Iowa City children over a 20-year period were constructed for clinical use at the University of Iowa pediatrics department, they said. Recent studies have shown, they added, that the Iowa charts may be used to determine the growth patterns of both breast-fed and artificially fed infants.

"By trial and error in clinical practice, we found charts for infants, preschool and school children to be most practical," the authors said. "During infancy, which is a period of rapid growth and of frequent assessment of growth, the chart includes the first year of postnatal life

with the age scale divided in monthly periods."

The level of the height-age curve in relation to the level of the weight-age curve is an index to nutrition and general physical structure, but only when no disease or other markedly adverse environmental factor is present, Jackson and Kelly stated. Too much attention has been given to single observations of a child in relation to norms and not enough to the importance of serial values, they said, adding that faulty interpretation has caused confusion and that inaccurate measurements are worse than none at all.

### Child Safety Education Initiated in New York

More children aged 1 to 5 died from accidents in New York City in recent years than from the principal communicable diseases combined, reported Harold Jacobziner, M.D., M.P.H., assistant commissioner in charge of maternal and child health services, New York City Department of Health, and Herbert Rich, B.A., senior statistician with the department. Fatal accidents account for the highest death rate in preschool children, and, in addition, they said, the number of nonfatal accidents is estimated at 150 times as many.

To meet the accident problem, the New York Bureau of Child Health instituted, in 1951, a home safety and accident prevention program to study the cause of nonfatal accidents among preschool children and to develop techniques for the control and prevention of accidents, Jacobziner and Rich said.

"Every accident must be thoroughly investigated and the many interrelated factors understood," they said. "In any accidental occurrence, the agent, host, and the entire environment must be studied. Time, place, season, mechanism of occurrence, physical, cultural, emotional, and sociological elements must also be taken into account. In the occurrence of some accidents, it

is possible that the agent is of far lesser importance than the host, the environment, their impact, and interrelationship."

### Parent-Staff Education

Now in its third year, the educational part of the program has become an integral part of the routine child health conference, they reported. Physicians and public health nurses are in a strategic position to contribute significantly to reducing the incidence of fatal and nonfatal accidents in infants and young children, they asserted.

The medical and nursing staffs of the New York City child health stations receive preservice and inservice training on accident prevention and home safety, the authors said. Abstracts of current literature and technical instructions on accident prevention are issued periodically to these staffs, the speakers reported. An accident report form which physicians in child health stations are required to complete and the interrogation of parents serve as valuable teaching devices for the staff and the parents, they indicated.

Physicians are requested to "immunize" parents by means of education on the need for home safety and accident prevention, they stated. Individual anticipatory guidance for the child's stage of growth and development is given to parents, who also receive a safety checklist devised by the American Academy of Pediatrics, the speakers added. The problems revealed by the list are discussed with parents at their next visit to the child health station, they said.

### Epidemiological Studies

Statistical findings by age group, sex, color, place of occurrence, and cause on the first 981 children who had 1,000 nonfatal accidents from April 1952 through March 1953 were presented by the authors. They also reported these and other significant findings:

The sex difference was statistically significant—567 accidents among males and 433 for females. Highest

incidence among males occurred at ages 12-17 months; for females, at 24-35 months. Accidents requiring medical care also showed a sex difference (292 for males and 199 for females) and were highest in incidence for both sexes in the 24-35-month age group.

Most accidents, more than 65 percent, occurred in the children's own homes—only 18 percent occurred outdoors. Indoor accidents decreased

and outdoor accidents increased as the children grew older.

Falls accounted for 45 percent of all injuries, and burns for 21 percent. Burns were most frequent in the age group under 1 year and decreased as the child grew older, ranging from 27 percent in the under 1 year group to slightly more than 7 percent in the group aged 5 and over. Falls followed the same pattern but increased sharply at age 5.

## Studies in the Virus Diseases, Human and Animal

*Bat rabies made its appearance in the United States for the first time and its significance was explained in detail in two reports to the epidemiology and laboratory sections. Another significant first was the report of the successful experimental gamma irradiation of pork—a method which could be widely used against trichinosis, according to its developers. Other reports included a study on the widespread distribution of psittacosis antibodies, the tracing of vesicular exanthema to infected animals and raw garbage, and a survey of the use of phenolized rabies vaccine in Texas. Warning against indictment of viruses without sufficient evidence, one scientist listed guideline criteria for virologists.*

### Guideline Criteria Listed For Virologists

Urging the need for criteria to determine the etiological significance of newly recognized prevalent viruses, Robert J. Huebner, M.D., chief, Virus and Rickettsial Section, Laboratory of Infectious Diseases, National Microbiological Institute, Public Health Service, offered some useful suggestions which should not be considered "postulates" or even "advice to forlorn virologists."

The suggestions are not new and most are fully stated or implied in

the 4 rules postulated by Koch in 1891 for determining the etiological role of a potential pathogen, and their revision in 1937 by Rivers for application to viruses, Huebner said.

#### Popular Diagnosis

"Virus infection" has become one of the most popular methods for expressing current medical opinion about what is wrong with patients suffering from widely prevalent minor illnesses, he said, and the full-time virologist finds it difficult to keep track of the numerous reports coming in from all laboratories of

new and prevalent viruses often found in association with human illness. Although it would seem that the diagnostic acumen of the clinician and the skill of the virologist are each steadily moving together toward solution of some of the more common and vexing of human medical problems, this is far from apparent, Huebner believes.

#### The "Bill of Rights"

"It is quite apparent that the clinician seldom, if ever, knows that the illness he describes actually is caused by a virus, or if by a virus, what virus," Huebner continued. Likewise, he maintained that the virologist reporting new and prevalent agents very often has only slightly more information than the clinician and usually very little certainty about the illnesses for which his viruses presumably are responsible.

A guarantee should be extended to viruses against the imputation of guilt by simple association, Huebner suggested. "But this is, in a sense, a negative approach, one designed to prevent trouble perhaps but not necessarily very helpful when one has a newly recognized virus on his hands."

When significant associations are observed between an agent and a disease, and even when an infectious process is established by immunological procedures, etiological relationships are not necessarily established, Huebner said in urging that the virologist be "just as much an epidemiologist and clinician when studying the effects of viruses on man as he is a well-grounded experimentalist when studying similar effects on mice."

The increasing proficiency in demonstrating viruses has produced a "disconcerting but not unwelcome paradox—the spectacle of new information leading to confusion," Huebner noted. To eliminate some of the prevalent confusion, he listed seven suggestions.

#### Useful Guidelines

*A virus should be well established in animal or tissue culture passage*

in the laboratory—"It is not too much to ask of a virus that it should be real, tangible enough to describe and hardy enough to stand the trip to other laboratories," Huebner said.

*The virus must originate not in the experimental animals or media employed but in the material stated and shown by repeated isolation to be present therein*—"The literature is replete with reports of viruses acquired from laboratory animals or procedures which at first glance only appeared to be responsible for human disease."

*The agent when recovered from a human source should be shown to have produced an active infection as revealed by an increase in neutralizing or other serologically demonstrable antibodies*—"Failure of such a presumed source to develop antibodies must be regarded as evidence against an etiological role."

*The virus should be characterized as completely as possible so that comparisons can be made with other agents already known and described or soon to be discovered*—Host ranges, pathological lesions, measurements of size, susceptibility to inactivation by host and chemicals are important characterizations. "Of even greater importance is the preparation of specific immunological reagents such as antigens and antibodies characteristic of the organism which should permit rapid objective identifications of the agent."

*If the disease is a well-defined, recognizable entity, the agent should be constantly associated with it, and if tissues of the host are available at a suitable time during the course of the illness, the agent should be found in the diseased areas*—But opportunities to do this in prevalent nonfatal illnesses rarely happen.

*If the inoculation of human volunteers is considered feasible and is used, the agent must reproduce a clinical syndrome consistent with that observed in the original hosts*—That the limitations of human volunteer methods must be fully understood and proper adjustments must be made for the subjective impres-

sions produced in both observers and the subjects is of utmost importance when studying poorly defined minor illnesses which are familiar to all from personal experience.

*When new and prevalent viruses are found causing infections in association with prevalent nonfatal illnesses, high order information about the etiological significance of such agents can only be acquired by the proper application of the epidemiological method*—It is the failure to do this which is largely responsible for much of the confusion. Fortunately, when studying prevalent agents, it is possible to anticipate their occurrence and to observe their effects in longitudinal studies of community groups.

### Texans Urge Caution in Use Of Rabies Vaccine

Sporadic reports of antirabic vaccination complications and treatment failures suggested a need for data on the reaction to phenolized rabies vaccine and led to a 4-year survey of the use of this vaccine in Texas, four members of the Texas State Health Department stated.

Reporting the findings were J. V. Irons, Sc.D., director, bureau of laboratories; E. B. M. Cook, M.A., principal immunologist, biologics division; Caroline Stearns, M.A., and Julian Feild, B.A., immunologists in the same division.

There were no reported cases of rabies in a group of 11,606 persons who were exposed to rabies and who received 14-dose treatments of phenolized rabies vaccine during the study period from 1949-52, said Irons and his co-workers. There were 11 human deaths from rabies in untreated persons during the same years, they said. Incidence of animal rabies in Texas is high, they claimed, pointing out that 27.6 percent of the 18,277 animal heads examined were proved rabid by laboratory test. They were of the opinion that most rabid animals presumably are not subjected to laboratory

examination. These figures indicate both a real danger of rabies infection in the treated persons who were bitten by rabid animals and the effectiveness of the vaccine treatment, they said.

In regions where rabies is highly endemic, physicians and health officers "are confronted with the management of both real and imaginary exposures," they stated. In their opinion, there is sufficient evidence of complications attendant on antirabic vaccination to make the treatment unadvisable for "those who have imaginary exposure and suffer from 'rabiphobia'." Vaccination is not recommended, they said, in the absence of a wound by the tooth of a rabid animal.

### Reactions to Vaccine

Of the 11,606 treatments of phenolized rabies vaccine used, completed reports were obtained on 6,881 treatments, the Texas study showed. "In analyzing the reports on use," they stated, "it was found that local reactions were recorded with surprising frequency, usually marked 'slight' or 'moderate.' There were 331 reported cases of systemic reactions, including adenopathy, fever, headache, nausea, and dizziness." There were 19 instances, of postvaccinal reaction to the treatment, one of which was fatal, the investigators said.

In reference to the type of injections, Irons and his associates said that the intramuscular route appeared to be associated with a lower incidence of reactions than the subcutaneous route. Neither the age of the patient nor the site of injection had any appreciable influence on the development of reactions, they reported.

Their analysis of the reported postvaccinal reactions showed treatment paralysis in 13 cases, a rate of 1 in 529 treated persons in the 6,881 completed reports. They concluded by urging "that the physician again be reminded and cautioned that the use of rabies vaccine is not at all an entirely harmless process and should be restricted to persons definitely at risk of rabies infection."



## RABIES



### Málaga-Alba Describes Vampire Bat Rabies

The concept that the carrier state of rabies in the vampire bat is an aberrant form of the disease must be modified, stated Aurelio Málaga-Alba, B.Sc., M.R.C.V.S., World Health Organization rabies consultant. Dr. Málaga-Alba's headquarters are in Mexico, D.F., at the regional office of the Pan American Sanitary Bureau.

The fact that vampires can transmit rabies, as well as act for a length of time as rabies carriers must be recognized as the typical manifestation of the disease in the order Chiroptera, Málaga-Alba added. This is especially so, he said, since Pawan, in his critical experiments with fruit-eating bats (*Artibeus planirostris trinitatis*), has proved that

bats may recover from rabies, harboring the virus in the brain and salivary glands, behaving like healthy or passive carriers, or they may die of the disease.

#### Minimum Human Hazard

The low incidence of vampire bat rabies in man is remarkable when one considers that the disease in cattle has been recognized for almost 45 years and that it has killed thousands of animals, the WHO consultant noted, adding that the first human cases were reported in Trinidad, in 1925; that 89 deaths from the disease have been registered on the island since then; and that the first case outside Trinidad was reported in 1951 from the state of Sinaloa, Mexico. The few known cases in man must be considered the exception, not the rule, he said.

"The low susceptibility of man and

dog to the vampire strain has considerable epidemiological importance, since it reduces the magnitude of the public health hazard, although it does not minimize the possible danger of the bat as a rabies carrier," he continued.

#### Other Species

Rabies in the order Chiroptera is not limited to vampire bats, the rabies consultant commented. Rehaag, Pawan, Regan, and others have found the disease in the species *Phyllostoma superciliatum*, *Artibeus*, *Hemiderma*, *Diclidurus*, *Myotis lucifugus*, *Epitesicus fuscus*, and *Molossus nigricans*, he said, and the first positive reports of the disease in the United States concerned the species *Dasypterus floridanus* and *Nycteris borealis seminola*.

Earlier, Málaga-Alba had mentioned that the sanguivorous family, the Desmodontidae, also characterized by their walking on all fours, is composed of only three genera, each with a single species. The family includes, in addition to the common vampire bat (*Desmodus rotundus*), a hairy-legged less-adaptable member (*Diphylla ecaudata*), and the white-spotted vampire (*Di-oemus youngui*), he said. The latter has only been identified in Brazil, Guiana, Venezuela, and Colombia, he reported, whereas the common vampire has a wide distribution, from Argentina and Chile to the state of Sinaloa, Mexico. The nearest locality to the United States where vampire bats have been found is near



Face of *Desmodus rotundus*. Notice M-shaped nose and bifid lower lip.



Common vampire bat (*Desmodus rotundus*).

Linares, Nuevo Leon, about 100 miles from the border, he noted. The habitat of vampires is limited to tropical and semitropical areas, or where geographic accidents determine such climatic conditions, he added.

#### Manifestations

Rabies in bats differs not substantially from rabies in birds, developing a characteristic carrier state, he said, but may manifest itself in the classical furious or paralytic types, common to all mammals infected with rabies. The clinical symptoms in fowl are characterized by incoordination, paresis, followed by paralysis, emaciation, and death, he said. Carrier manifestations have been observed in naturally infected bats and have been reproduced experimentally, he noted. *Desmodus rotundus murinus* is the reservoir of paralytic rabies, he said. Málaga-Alba also described the incubation period, the stage of fury, the paralytic stage, and the carrier stage of rabies in bats.

The WHO consultant told how the rabies virus, by repeated passages through the bat, has been modified in its pathogenicity, developing a definite species specificity. The virus is of low virulence but of high invasiveness, showing its greater pathogenicity for cattle and other domestic ani-

mals, while dogs and man are decidedly less susceptible to the strain, he said.

#### Gamma Irradiation of Pork May Prevent Trichinosis

Gamma irradiation of pork protects the consumer from trichinosis and has many advantages over methods now in use, according to a report made by a Michigan group of researchers.

Discussing irradiation of pork as a public health measure were S. E. Gould, M.D., Sc.D., pathologist at Wayne County General Hospital and clinical professor of pathology, Wayne University College of Medicine; Henry J. Gomberg, Ph.D., associate professor of electrical engineering and assistant director of the Michigan Memorial-Phoenix Project; and Frank H. Bethell, M.D., professor of medicine. All are members of the Atomic Energy Commission Laboratory on Biological Effects of Irradiation, University of Michigan.

At present the consumer must rely chiefly upon adequate cooking of pork for protection against trichinosis, the scientists said. They added that they did not believe the consumer should be expected to assume

responsibility for prevention of this disease, which is a public health problem.

#### Advantages of Irradiation

The speakers said that irradiation of pork is analogous to pasteurization of milk; it is not a substitute for sanitation but it guarantees protection to the consumer should sanitation be defective. The method is simple, effective, rapid, requiring only about 1¼ minutes. It should eliminate fear of trichinosis. The flavor of the meat is not changed by the process and no reactivity results.

The method described by Gould and his colleagues is relatively inexpensive, particularly for larger and more centralized plants. It requires only a single room, a source of radiation, and a technical staff of only one or two persons. If the total investment, including interest, is amortized over a 5-year period, the estimated cost of a plant with a daily capacity of 2,000 hogs would be 2.3 mills per pound of meat processed; over a 10-year period, 1.5 mills per pound, with even lower costs in subsequent years. For a plant processing about 8,000 hogs per year, the cost would be 7.4 mills per pound.

Heating, freezing, or curing of ready-to-eat pork products—sausages and smoked ham, for example, which in United States-inspected plants comprise approximately 30 percent of the pork produced—would be largely unnecessary if irradiation were used, they stated.

#### Locate Positive Evidence Of Bat Rabies in Florida

Six Florida yellow bats (*Dasypiterus floridanus*) have been found infected with rabies since a child living on a ranch in central Florida was bitten by an infected bat of the same species, the Florida State Board of Health reports.

Collaborating in the report are Homer D. Venters, B.S., and Warren R. Hoffert, M.S., respectively chief and bacteriologist in charge,

## VESICULAR EXANTHEMA

Tampa Regional Public Health Laboratory; also James E. Scatterday, D.V.M., public health veterinarian, Florida Bureau of Preventable Diseases, and Albert V. Hardy, M.D., Dr.P.H., director, Florida Bureau of Laboratories.

The authors described the history of the first reported case of bat rabies in the United States—the child recovered—its confirmation in the laboratories, and the subsequent identification of the infected bat as a lactating female Florida yellow bat. They next interpreted the limited findings of a bat survey, prompted by the attack on the youngster, conducted in Florida before the heavy rainfall season of 1953. They concluded with some comments on the significance of their findings.

### Laboratory Tests

Bats on wing near the ranch where the attack occurred were shot, collected, and then examined. Colonial bats were collected from another area, some 300 miles away. Both colonial and noncolonial bats were first

examined microscopically for evidence of rabies.

Brains were removed, and impression smears were prepared, using one-half of the tiny brain for microscopic determination of rabies. The other half was reserved for mouse inoculation. Species were identified by the University of Florida (Sherman) and the Chicago Natural History Museum (Sanborn).

Six noncolonial bats (all shot in central Florida) were found positive for rabies; 4 of these were among the 85 bats taken from the area where the boy was bitten; 5 were Florida yellow bats; and 1 was a Seminole bat (*Lasiurus seminola*). The species and numbers of bats collected and the number found positive are shown in the accompanying table.

Including the bat which bit the boy, 6 Florida yellow bats have been proved infected with rabies.

Microscopically, all colonial bats were negative for rabies. The mouse inoculation tests were also negative.

In 6 of the 7 confirmed positive

findings, initial microscopic examination revealed inclusions considered typical Negri bodies.

Material derived from another Florida yellow bat produced symptoms simulating rabies but without Negri body formation.

### Some Opinions

The believed rarity of the Florida yellow bat is open to doubt—this species was most commonly found during the summer months in the central Florida area.

The insect-feeding, free-living (noncolonial) bats, which include *Dasypterus floridanus*, attack man only in most unusual circumstances—possibly the child victim came too near the young of the lactating female.

The observations may represent a localized and unique situation in Florida, or a common, but unrecognized one.

The probable source and transmission of rabies infection in the insectivorous free-living bats is subject to speculation—perhaps the bites of vampire bats on other bat species is the explanation.

If free-living bats migrate, this could explain the locally observed infections.

The high rabies prevalence in bats collected near the ranch indicates either a ready spread or a prolonged infection.

The direct exposure of humans to bat rabies in the United States is a minor risk.

### Links Vesicular Exanthema To Raw Garbage

A study of vesicular exanthema in California, where the disease was confined until 1952, indicates that the infection has no seasonal predominance and is spread by contact with infected animals or products from infected animals often found in raw garbage, stated R. A. Bankowski, D.V.M., Ph.D., associate professor of veterinary medicine, University of

**Rabies prevalence in apparently normal bats of varying species collected in central and western Florida, 1953**

Species of bat	Central Florida		Western Florida <sup>1</sup>	
	Number examined	Number positive	Number examined	Number positive
Noncolonial:				
Yellow ( <i>Dasypterus floridanus</i> )----	138	5	0	0
Seminole ( <i>Lasiurus seminola</i> )-----	61	1	0	0
Red ( <i>Lasiurus borealis</i> )-----	9	0	0	0
Total-----	208	6	0	0
Colonial:				
Little brown ( <i>Myotis austroriparius</i> )-----	0	0	129	0
Free-tail ( <i>Tadarida cynocephala</i> )-----	29	0	2	0
Twilight ( <i>Nycticeius humeralis</i> )-----	11	0	0	0
Georgian ( <i>Pipistrellus subflavus</i> )-----	3	0	1	0
Big brown ( <i>Eptesecus fuscus osceola</i> )-----	1	0	0	0
Total-----	44	0	132	0
Total number of bats-----	252	6	132	0

<sup>1</sup> Some from Thomas County, Ga.



California School of Veterinary Medicine.

Within an outbreak, he said, the disease is spread by the infected animals or by contaminated materials and objects, but there is considerable evidence to suggest that feeding raw garbage to hogs has been the chief means of perpetuating this disease in California. He specified that the 1,400 outbreaks reported between 1932 and 1952 were found predominantly on the 400 garbage-feeding establishments in the State. Only 53 outbreaks have been found on the 19,600 grain-feeding ranches, he said, and in nearly all of these, the disease has been attributed to the introduction of hogs which had been fed raw garbage.

#### *Unpredictable Behavior*

Characterizing the disease as "erratic and unpredictable," the speaker stated that no infected meat, meat scraps, or material could have remained from the outbreaks in 1932 to cause an outbreak reported 11 months later 70 miles away, nor from the outbreaks in 1933 to cause an outbreak in June 1934, 500 miles distant. Each time, the disease was eradicated by slaughtering the swine and cleaning and disinfecting the premises, pens, vehicles, and equipment, and, in the first series of outbreaks, by the imposition of rigid quarantines, he explained.

He noted that the disease, unreported for 3½ years, broke out again in the winter months of 1939, on a garbage-feeding ranch, and that outbreaks steadily increased from that date on, appearing outside the State for the first time in 1952.

Reporting that three distinct types of vesicular exanthema virus have been recovered from outbreaks in California, Bankowski pointed out that only one, type B, has been found in the outbreaks occurring outside the State, according to serologic studies of a large number of outbreaks in various States, indicating, he said, that the epizootic involving most of the States in 1952 and 1953 resulted from a single incident.

#### *Diagnostic Procedures*

An accurate and rapid method of differentiating between the three major vesiculating diseases, foot-and-mouth disease, vesicular stomatitis, and vesicular exanthema, which so closely resemble each other that clinical diagnosis is impossible, is of "extreme importance," Bankowski maintained.

The recently introduced complement fixation test has proved to be a great aid in making a rapid diagnosis and is also capable of differentiating the virus into its immunological type, he said.

Of 221 samples of infected material from hogs found to be suitable for testing and submitted to the California Bureau of Livestock Disease Control Laboratory, 80.5 percent were successfully typed, he reported.

#### **Report Wide Distribution Of Psittacosis Antibody**

Complement fixation tests on human, cattle, and sheep serums collected from the western States indicate that the antibody to the psittacosis-lymphogranuloma group of viruses is widespread, stated Robert K. Gerloff, M.A., and David B. Lackman, Ph.D., both with the

Public Health Service's Rocky Mountain Laboratory at Hamilton, Mont.

They reported the following findings from serologic tests:

1. Of 1,915 specimens examined for psittacosis antibody during an 18-month period, 31 showed antibody titers of 1:16 or 1:32, 5 gave titers of 1:64, and 12 had titers greater than 1:64. Seven of the individual patients from whom serum specimens showed titers greater than 1:64 probably had psittacosis, according to clinical and epidemiological evidence and the laboratory findings.

2. Of 339 serums from workers in turkey-processing plants in Utah, 25, or 7.4 percent, showed psittacosis antibody titers of 1:16 or greater.

3. In a group of 42 serums from sheepherders in Idaho, 7, or 16.7 percent, were positive.

4. Cattle and sheep serums, collected in connection with a Q fever and tularemia antibody survey and not because of any clinical evidence of psittacosis infection, showed low to moderate levels of the antibody (see accompanying table). In a few animals, antibody titers reached a presumably diagnostic level.

Discussing these findings, the investigators pointed out that lymphogranuloma venereum is practically nonexistent in the northwestern

#### **Survey of cattle and sheep serums for antibody against psittacosis virus**

Source of serums	Number of serums tested	Percent of serums showing complement fixation titer in the range:		
		1:8-1:16	1:24-1:64	Above 1:64
Cattle, western Montana----	151	16	6	0
Cattle, southern California---	302	30	18	3
Cattle, Idaho-----	53	40	17	2
Cattle, Kansas <sup>1</sup> -----	199	26	21	17
Cattle, Colorado-----	117	10	10	0
Sheep, Idaho-----	473	7	7	2

<sup>1</sup> Being studied for bovine encephalomyelitis.

States and that the presence of antibody to these viruses is only occasionally explained by a recent illness suggestive of psittacosis. "Whether it results from subclinical infections with some member of this group or from constant exposure to a virus present in the environment but not capable of producing illness is not known," they said.

## Isolation Studies

Remarking that isolation attempts are continually being made at the Rocky Mountain Laboratory to extend the knowledge of the reservoirs of the psittacosislike viruses, the scientists reported five isolations of

a virus antigenically related to psittacosis from feces of calves in western Montana. Their isolations, they said, are similar to an apparently nonpathogenic strain isolated from the intestinal tract of calves in New York State, indicating that this agent is probably of widespread occurrence.

A negative finding reported by Gerloff and Lackman was the inability to isolate the ornithosis virus from a group of 103 pheasants living in their natural habitat. These pheasants, they noted, inhabit the same area of western Montana where ornithosis virus is readily obtainable from pigeons.

microscopic slide and fixed, they explained. The slides are sent to the laboratory where Papanicolaou's stains are made and are then examined by competent pathologists.

"Although recently introduced," they said, "it has been clearly established that this method is a practical screening procedure and can be performed by women of all intellectual levels. The smears have proved to be as satisfactory as those secured by physicians in the usual way."

The method was developed in an effort to parallel the breast self-examination program, which the two physicians recognized as a "marked advance in cancer control." It is established that 95 percent of all lumps in the female breast are discovered by the patient herself, they maintained.

## Role of Cancer Clinic

Rosenthal and Oppenheim felt that the service feature of cancer prevention-detection centers is and should be minor to the broad public health control phases which should include:

1. Research into more direct methods of cancer detection.
2. Training of medical practitioners, that is, training in the performance of complete and adequate physical examinations.
3. Teaching of undergraduate medical students so that true cancer awareness may be aroused.
4. Development of improved public health control methods, such as mass-screening procedures.
5. Improved health education.
6. Accumulation of statistical data.

Noting the difficulty of measuring the cancer problem in New York City, where cancer is not a reportable disease, the physicians estimated a total of 20,077 expected cases for 1950, applying age and sex specific incidence rates published by the New York State Department of Health to the population of the city. They also estimated a gross annual total of 21,750 cases of cancer for 1952, on the basis of the trend ex-

# Recent Cancer Research And Control Studies

*At two sessions of the Public Health Cancer Association, in a meeting of the APHA epidemiology section and a meeting of the APHA industrial hygiene section, and at a joint session of the American Association of Registration Executives with the APHA epidemiology, food and nutrition, industrial hygiene, and statistics sections, discussions on recent developments in cancer control centered around Hueper's and Cutler's reports on environmental cancer, California's study of the relationship between cigarette smoking and lung cancer, the use of vaginal smears in cancer detection and prevention at New York City cancer centers, Sutherland's studies of emotional problems related to cancer, and the revision of minimum standards set by the American College of Surgeons for cancer clinics in general hospitals.*

## Patients Take Own Smears In Screening Program

Participation by patients of the New York City Department of Health cancer prevention-detection centers in obtaining their own vaginal smears is working out successfully, reported Theodore Rosen-

thal, M.D., director of the department's Bureau of Adult Hygiene, and Abraham Oppenheim, M.D., physician in charge of the East Harlem center.

The procedure involves the use by the patient at home of an applicator or aspirator to secure vaginal secretions, which are then placed on a

hibited in the upstate data, adding that this is probably a conservative estimate.

Presenting the findings of 5,687 initial examinations of asymptomatic persons at three cancer prevention-detection centers from September 1947 to April 1953, they specified that 30 percent of the males and 16 percent of the females were recorded as having no evidence of disease, and that a total of 58 proved primary cancers were diagnosed in 57 individuals, about 1 percent of all examinees.

### An Additional Study Of Lung Cancer

Environmental histories of patients with lung cancer were obtained in a study begun 4 years ago by members of the staff of the California State Department of Public Health. The environmental factors studied covered occupational exposure to chemicals and radiation, atmospheric influences, and the use of tobacco.

Reporting on the study were Lester Breslow, M.D., M.P.H., chief of the bureau of chronic diseases; LeMar Hoaglin, B.A., occupational

analyst; Gladys Rasmussen, B.A., public health analyst; and Herbert Abrams, M.D., M.P.H., formerly chief of the bureau of adult health.

Of 518 hospital patients with histopathologically proved diagnoses of lung cancer, 93 percent gave a history of having smoked cigarettes, whereas only 76 percent of a matched control group gave a similar history, the investigators specified. "No such greater frequency of tobacco used in other forms occurred among the lung cancer patients when compared with the control group," they stated.

#### Habit Comparisons

Additional findings presented by the group concerned the use of tobacco in other forms, amount of cigarette smoking, age of beginning cigarette smoking, smoking habits, and "cigarette cough."

"Seventy-four percent of all lung cancer patients reported smoking one or more packs of cigarettes on the average per day for the preceding 20 years, compared with a frequency of only 42 percent among the controls," they stated.

#### Occupations Implicated

The investigators also reported that the data obtained from this study suggested several occupations,

in addition to those previously identified as having an etiological relationship, which may be involved in the development of lung cancer (see table). Several of those with the most striking differences, they pointed out, involve exposure to metallic particles and fumes and products of metallic combustion.

Life-long occupational and habit histories were obtained by actual interview, they specified, the occupational history including the number of years engaged, name of company, type of industry, a description of duties, and a list of products and any hazardous materials used.

Breslow and associates recommended intensive study to determine to what extent persons engaged in the implicated occupations suffer a special risk of lung cancer. If an etiological relation is clearly established, they added, the precise exposure and mechanism responsible should be identified so that protective measures may be introduced.

### Cancers as End Products In a Chain of Reactions

Symptomatic environmental cancer patterns indicate that cancers are not diseases per se but the end products of a long chain of preceding and associated functional and anatomic reactions, reflecting a course of events similar to that found with some of the chronic infectious diseases, W. C. Hueper, M.D., chief, Environmental Cancer Section, National Cancer Institute, Public Health Service, told the Public Health Cancer Association. Environmental cancers bear some epidemiological resemblance to chronic infectious diseases, he said.

Since occupational cancers are almost the only human cancers for which a definite cause is known, they are the opening wedge into the etiology of cancer in man, Hueper explained. Control by prevention is not only the most humane but the most economical method for contain-

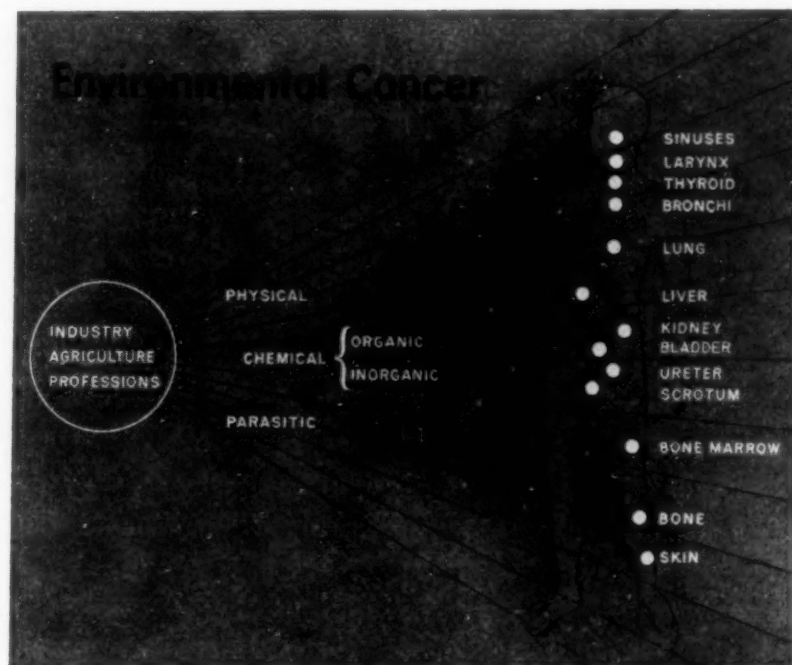
**Number of lung cancer patients and controls employed for at least 5 years in selected occupation groups<sup>1</sup>**

Occupation	Lung cancer patients	Controls
Welders and sheet metal workers doing welding .....	14	2
Steamfitters, boilermakers, asbestos workers .....	10	1
Electric bridge crane operators—metal industry .....	5	1
Occupations in the extraction of lead, zinc, and copper ore .....	9	2
Marine engineers, firemen, oilers and wipers .....	12	6
Construction and maintenance painters .....	22	12
Cooks, commercial (excluding cannery cooks) .....	35	21

<sup>1</sup> Occupation groups based on regrouping according to common occupational exposures after detailed examination of records.



## CANCER



### ▲ Cancer locations

ment of cancer, he asserted. The disease kills 200,000 in the United States every year, he said.

The overwhelming number of occupational cancers and cancer-producing agents has been recorded during the last 50 years, Hueper said (see table). Most made their appearance after the start of the modern industrial era, he pointed out. The majority of the cancers known before 1900 affected the skin—the newly discovered cancers in recent decades were causally related to the respiratory system, particularly the lung. The environmental carcinogenic spectrum thus underwent, during the last half century, an extensive broadening of its range and an appreciable diversification in the nature of its component parts, he asserted. The phenomenal and alarming rise in the frequency of lung cancers in all industrialized countries is at least in part related to this development.

There are, at present, no worthwhile data on the incidence or frequency of occupational cancers occurring in United States industries, with the possible exception of lung

cancers occurring in the chromate industry, Hueper said.

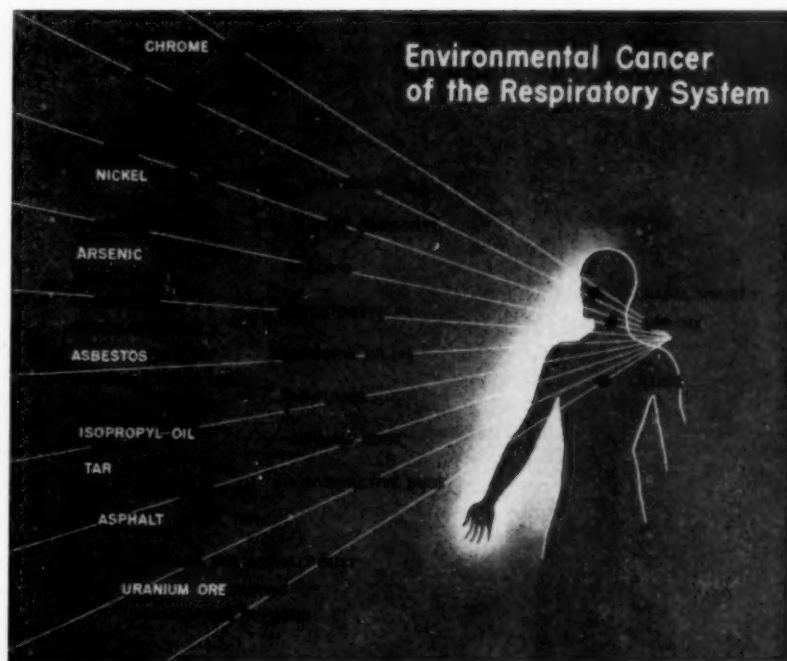
### All Are Susceptible

Given the same carcinogenic agent and identical or similar intensity and duration of exposure, cancers are bound to occur among exposed workers regardless of the type of industry involved or the country in which it is located, Hueper noted. To assume that the carcinogenic action of a certain material may differ depending upon the general character of contact is a fallacy, he said.

Most cancers occur in later life because of the long period cancers take to develop. Range of latency is, depending on the agent and the site, from 1 to 75 years, he said. No correlation exists between the irritative action of a chemical agent and its carcinogenicity, Hueper indicated.

"Observations on experimental animals have led to the adoption of the rule that all environmental agents which are capable of producing cancers in experimental animals when introduced into them by any route should be suspected of having a similar effect in man unless and until

### Carcinogens ▼



### Occupational cancer cases recorded in the United States and Europe before and after 1928

Agent	Site	Number of cancers in United States		Number of cancers in Europe	
		Before 1928	1928-1952	Before 1928	1928-1952
Arsenic.....	Skin.....		7	14	25
Coal tar pitch.....	Skin.....	6	110	908	3, 150
Petroleum.....	Skin.....	50	70	26	29
Shale oils.....	Skin.....		7	435	1, 900
Lignite tar and paraffin.	Skin.....			14	14
Creosote oil.....	Skin.....		1	26	40
Anthracene oil.....	Skin.....			19	20
Soot-carbon black.....	Skin.....		1	189?	190
Aromatic amines.....	Bladder.....		250-300	220	1,100-1,200
Roentgen- and radium-radiation.....	Skin.....	36	(?)	68	(?)
	Leukemia	1	16	5	13
	Lung.....			311	650
Total.....		93	<sup>1</sup> 450-500	2, 235	<sup>1</sup> 7, 250

<sup>1</sup> Approximate.

their innocuousness to man is definitely demonstrated," Hueper reported.

### Industrial Cancer Data Collection Methods

The extent of the difference between a "normal" rate of disease incidence in the general population and the rate in a given industry, plant, or operation under suspicion is the first consideration in acquiring and evaluating statistical data on the incidence of occupational cancer, three investigators from the National Cancer Institute, Public Health Service, told a joint session with the American Association of Registration Executives.

After deciding how great a difference is needed to indicate the exist-

ence of a cancer hazard, research workers in the field must determine the necessary degree of protection against error, according to Sidney J. Cutler, M.A., analytical statistician; Marvin A. Schneiderman, M.A., and Samuel W. Greenhouse, B.S., mathematical statisticians.

### The Exposed Group

Scientific requirements may call for a study involving many persons who must be followed for a long period of time, and perhaps no study should be undertaken unless the proper funds are available, they continued. If a suspected cancer hazard is under investigation, it is necessary to restrict the study group to individuals who are directly exposed to the apparent cancerogenic agent, they recommended in pointing out that the inclusion of other employees not directly exposed to the hazard

might result in missing the existence of a dangerous condition.

Cutler and his associates pointed to another type of error, which they described as deciding that the rate in a plant exceeds the general rate when in fact it does not—a conclusion which may lead management into extensive search for a nonexistent hazard.

### Data Collection

In discussing the collection of data, the statisticians said that complete medical records maintained by some industrial plants may be a source of information on a specific disease hazard. But they cautioned that rapid employee turnover together with an extended latent disease period may result in a gross understatement of the cancer incidence rate. The procedure they recommended is the selection from company personnel records of persons employed as of a given date and the followup of these persons for a long enough period of time for the effects of exposure to the suspected cancer hazard to manifest themselves. They emphasized the necessity of confining the study to individuals employed for a sufficient period of time to constitute effective exposure.

To illustrate a scientifically valid study, they selected an industrial plant which employs 2,500 persons, and in which there is a suspected respiratory cancer hazard. Said to be engaged in operations which expose them to the suspected cancerogenic agent are 1,000 male employees. "We know that in the general population of males 15 to 65 years of age, the annual incidence of respiratory cancer is about 40 per 100,000. Economic and medical considerations have led us to decide that if the rate among the 1,000 males is 200 per 100,000, or more, a definite hazard exists, and we want to find it," Cutler and his associates said.

### Confidence Limit Concept

They decided the 1,000 production workers should be followed for 5 years, a procedure which would yield 5,000 person-years of observation,

and, if no specific cancer hazard existed, would probably uncover 2 cases of respiratory cancer. They assumed that 8 cases of respiratory cancer were found in 5,000 person-years, a figure which made the best estimate of the plant rate to be 160 per 100,000.

This rate, they said, is 4 times the general population rate of 40 per 100,000. "However, 8 cases in 5,000 person-years of observation could have arisen out of a smaller basic rate than 160 per 100,000," they continued. The observed rate doesn't necessarily warrant the expenditure of large sums on safety measures, they said. To guard against error, they figured the smallest possible rate, on a probability basis, that might exist in the plant and produce as many cases as were found. According to confidence limit tables included in the report, they said there is a 5-percent probability that the lowest rate, which could produce as many as 8 cases is 3.9 which implies a rate of 78 per 100,000.

"The confidence limit concept," they said, "can be used to arrive at meaningful decisions about further work." If, for instance, only 4 cases of respiratory cancer had been observed in 5,000 person-years of observation, the confidence limit tables could be consulted to learn the maximum number of cases which could have produced that rate. There is a 5-percent probability, they said, that 9.2 cases could exist when only 4 were observed.

The question of further investigation and factory safety measures are substantive, they concluded, "and each separate investigation will have to be considered on its own merits."

## Cancer Patient Behavior Clue to Adaptation

A cancer patient does not have a single emotional reaction which continues from the onset of symptoms to the termination of convalescence; rather, he experiences a sequence of intimately related reactions which

are modified by his perception of each phase of diagnosis and treatment, according to Arthur M. Sutherland, M.D., associate attending physician and psychiatrist at the Memorial Center for Cancer and Allied Diseases, New York City.

Speaking before the Public Health Cancer Association, Sutherland reported that studies of the emotional problems associated with cancer and its treatment were begun in late 1950. The sequence of emotional reactions, he said, can be characterized as consisting of four stages: onset of symptoms, diagnosis, hospitalization for surgery, and convalescence. The reactions in each phase determine the patient's ability to integrate the total experience and set the tone for his long-term adaptation.

In regard to the first stage, Sutherland pointed out that delay in seeking treatment is a method of dealing with severe expectations of injury. Avoidance, usually associated with less severe expectations of injury, is often based on fears of inacceptability to others as a result of the changes brought about by surgery. These fears are commonly reinforced by examples of unhappy cancer survivors known to the patient, examples selectively chosen because they are consistent with the patient's expectations. Delay through the mechanism of avoidance is not confined to the ignorant, he stated, specifying that physicians and their wives are often delayers through avoidance.

### *The Prime Defender*

Hospitalization and surgery, he continued, are often crucial in determining the long-range postoperative adaptation of the patient, though the medical profession often tends to overlook or minimize the enormous emotional impact of major surgery. Besides fears for survival, there are active fears of mutilation, disfigurement, or serious body injury, which are reinforced by remoteness of the surgeon or of the medical personnel.

Sutherland noted also the danger that preoperative expectations of injury may be converted postopera-

tively into a firm belief that disabling injury has occurred, an injury not a part of the routine surgical experience, but a fundamental injury to the integrity and ability of the body to function normally again. The belief of essential or total body injury produces a syndrome very similar to the spontaneously occurring hypochondriasis, he said.

Discussing the importance of the cancer patient's family, he pointed out that a patient who has a chance of believing himself acceptable to his family has a better chance of believing himself acceptable to others. The prime defender in the setting of a potentially fatal illness in which extensive and possibly mutilative surgery is necessarily implicated is the physician or surgeon, he added.

## ACS Revises Requirements For Cancer Programs

Because of the many new developments in the field of cancer control, the American College of Surgeons has revised its program of minimum standards for cancer clinics in general hospitals, Walter E. Batchelder, M.D., assistant director of the college, announced to the Public Health Cancer Association. New requirements for approval of a cancer program by the college, effective October 9, 1953, replace the program inaugurated in 1930, he said.

Batchelder specified the following as the premises upon which the program is based.

"In order that the cancer program may be uniformly carried out and requirements established by the American College of Surgeons be consistently met, the college requires of hospitals:

"1. That a committee on cancer of the hospital medical staff be appointed as a policy group to plan, supervise, and appraise the cancer program.

"2. That a cancer registry be established under the general jurisdiction of the committee on cancer



for the purpose of recording all cancer cases.

"3. That organized cancer clinical activities, meeting the minimum requirements of the college for a cancer program, be established and maintained in conformity with policies set forth by the committee on cancer of the hospital."

#### *Policy and Specifications*

Again quoting from the requirements, Batchelder stated: "The cancer program must be conducted either in and by the staff of a hospital approved by the Joint Commission on Accreditation of Hospitals, or in lieu of this, by an organization, the cancer program of which has the formal approval of the local county medical society."

The requirements, which are being published in the January-February 1954 issue of the *Bulletin of the*

*American College of Surgeons*, contain specifications concerning composition and duties of the committee on cancer, establishment of a cancer registry, and cancer clinical activities, which may offer either cancer consultation service or cancer consultation and treatment service.

"Probably one of the biggest deficiencies found in our surveys of cancer programs is the lack of followup information," Batchelder said. "The Committee on Cancer [of the college] believes that this lack of information is not only detrimental to the welfare of the patient but also to the progress of cancer control." To help alleviate this situation the requirement "that a properly functioning cancer registry be in operation which records every patient, private and public, inpatient and outpatient, upon whom the diagnosis of cancer is established" was included.

result of the recognition of inservice training as one of the major ways of increasing job satisfaction and thereby decreasing turnover among the staff, he indicated.

Stating that activities of the training section are designed to meet training needs as seen by the employees, their supervisors in the operating units, or by the training section through surveys, Mattox described several typical projects.

#### *Supervisory Courses*

Training courses for supervisors and administrators were begun in 1948, he reported. The first, consisting of an eight-session series of monthly conferences, provided supervisors an opportunity to clarify their supervisory responsibilities and to discuss the application of supervisory skills to the problem of unit and employee performance, he stated. Introduction of the new worker to his job and surroundings, training the worker in new methods, improving his scheduling and flow of work, handling personal problems, evaluating performance, and developing promising employees were some of the fundamentals of this course. It also aroused the supervisors' interest in the 32-hour course in fundamentals of supervision which is being completed this year for all first-line and intermediate supervisors.

A course of four sessions given in 1952 for intermediate supervisors on the handling of personnel complaints was cited by Mattox as an example of coordination between personnel administration and training. This course, he said, emphasized the informal methods but also described the formal procedure which was a part of a new personnel relations procedure inaugurated for the entire department.

Training for professional staff and the top administrators in administrative techniques has been largely concentrated in the field of conference and discussion methods, Mattox noted, pointing out that the ability to solve problems effectively through group thinking in staff meetings is indispensable to most health admin-

## Inservice Training Programs, Health Department Assets

*That orientation and other employee inservice training programs contribute to better morale, higher efficiency, and a decrease in turnover—that they are, in fact, an essential part of the health department program—was the consensus of administrative personnel from the State health departments in New York, New Jersey, and Ohio. In a panel discussion at a meeting of the Association of Business Management in Public Health, they presented their arguments, using as a basis the inservice training programs which have been developed in these three health departments.*

### **New York Bases Program On Work Needs**

With the creation of a training section in its office of personnel administration in 1947, an employee inservice training program was added to the New York State Department of Health's long-established

professional training activities, Richard H. Mattox, director of the office, stated.

This program, he explained, consists of supervisory and administrative training, orientation courses, and clerical and technical assistance to on-the-job training activities. Establishment of the program was the

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istrators. The first course given in 1950 for nurse supervisors from city, county, and State health departments, 2 high-level sanitary engineers, 1 local health officer, 2 public health educators, and 1 nutritionist provided an opportunity for actual practice in leading discussions, as well as employing the usual training methods.

### *Orientation*

The basic orientation course, begun in 1948, for new and transferred employees in the State health department's offices in Albany consists of four 2-hour meetings, he continued. It gives information on the organization and functions of the department, civil service regulations, department personnel policies, and employee-benefit programs. A cost study in 1949 indicated an estimated annual saving of over \$3,000 as a result of planned orientation, Mattox reported, the major sources of saving being a reduction in turnover and more efficient use of supervisors' time. Without this course, he explained, each supervisor would have to supply the information.

Other courses mentioned by Mattox included a course in basic statistical clerical techniques for statistical clerks and junior statisticians, one in business English for clerks, stenographers, and typists, and special orientation courses for professional, administrative and technical employees. An employee handbook, he said, nearly half of which is devoted to the story of the health department and its programs, was published in 1952.

### **Skill of Man on the Job Is New Jersey Target**

It is a prime responsibility of public health administrators to recognize the need for employee inservice training, to realize its significance in the development of the workers, and, also to do something about the matter, declared William R. Peebles, chief of the bureau of personnel and

accounts, division of vital statistics and administration, New Jersey State Department of Health.

In assessing the value of inservice training, he maintained that it represents an investment in long-term service that can be recognized and evaluated. It brings about better performance of work by directing the knowledges and skills of the newer employee to the specific duties of his job and to prepare the older employee for advancement, he said.

Inservice training is one of the most neglected aspects of public employment, he maintained. Simple and effective training programs can be carried on at little or no extra cost, he said, adding that the time expended will be returned many times in improved morale, efficiency, and productivity, and that, even though employees are obtained through the competitive processes of a merit system, they cannot be expected to be completely prepared to perform the duties of particular jobs.

He also noted that inservice training enables adjustments to the changing concepts of public health and to the organizational changes which inevitably follow changing programs.

### *New Jersey's Experience*

Describing the development of inservice training programs in the New Jersey State Department of Health, Peebles admitted that action was delayed long after recognition of need "because we believed we could not afford it, or because we believed we didn't have the time or the instructors, or because we believed it was the responsibility of the civil service department to provide us with completely qualified workers."

He reported, however, that accomplishments to date, including an orientation program, a course for beginners and a refresher course in shorthand, and a series of monthly meetings for head clerks and other administrative assistants, have required no increase in staff or undue outlays of money. In addition, "we have learned that the skills demanded in good public health are not

always developed by training in general education institutions, and we now realize that it is more efficient to improve the skills of existing workers than to rely on recruitment of an undetermined and largely hypothetical external supply," he said.

In cooperation with the State department of civil service, the health department is currently engaged in developing (1) a course for training key supervisory employees in conference leadership and (2) a course in proper use of the telephone, Peebles said.

### **Ohio Stresses Orientation Of All New Employees**

Orientation for all new employees, a course in administrative practices for administrative personnel, and regularly scheduled staff meetings are the main elements of the employee inservice training program of the Ohio Department of Health as it was described by Earl O. Wright, chief of the department's division of administration.

Established after a careful study of various approaches, the orientation program is based on simplicity, yet is concrete enough to acquaint each new member of the staff with department organization and conditions of work, Wright said. A special feature, he indicated, is a 1-day trip to the various divisions in the department, the central laboratory, and the tuberculosis hospital, for all personnel from stenographers to physicians.

Wright noted a decrease in turnover among personnel in lower paid positions during the past year, which he said may or may not be a direct result of the orientation program. He felt certain, however, that the program is at least partially meeting and answering the problems that usually confront new employees.

In addition, Wright continued, an orientation syllabus for use in acquainting local health personnel with the State program as it relates to their programs is now being devel-

oped. He explained that each newly appointed local health commissioner spends a week at the State department sometime during the first month of his assignment.

### Staff Meetings

Defining inservice training as "the regular transmission of that information which will increase the efficiency of personnel and at the same time will make them feel they are a more integral part of the organization," Wright listed the following activities of the Ohio Department of Health: 2-hour biweekly staff meetings, following a prearranged agenda, for all division chiefs; monthly meetings of all division and

unit personnel; monthly meetings for all staff members responsible for administration functions; and monthly meetings in each of the 5 district offices and in the 3 branch laboratories.

He also noted the development of a 2-week course of study in administrative practices which is given to all new administrative employees and is used as a seminar course in cooperation with the Ohio State University. Portions of this course, he added, are used in the orientation program for newly assigned local commissioners, as well as students from schools of public health assigned to the department for field training.

## Health Programs and Their Aid To the Handicapped Child

*Surgical correction of congenital cardiac defects, the value to schools of services provided by a cardiac clinic for school children, and the dentist's problems in managing children with cerebral palsy were discussed before the maternal and child health and dental sections. In a joint session, these sections, the school health section, and the American School Health Association were told that special classes for handicapped children are not always necessary, and that periodic summary reports from local health agencies would serve the same purpose as universal reporting of cerebral palsy cases and be much less expensive and time-consuming.*

### New York City Fights Heart Disease

A total of 129 New York City children were hospitalized from April 1950 to October 1952 under a medical rehabilitation program designed to take advantage of the new surgical techniques for correction of certain congenital heart diseases, according to Helen M. Wallace, M.D., and Miriam Lending, M.D., director and consultant, respectively, for the bureau for handicapped children, and Her-

bert Rich, M.A., senior statistician, New York City Department of Health.

Upon the recommendation of the New York Heart Association to the city health department, a cardiac surgery advisory committee was formed, a decision made to pay for hospital care for certain children, and standards for care set up, they said.

The analysts reported data on the first 129 children in the New York City program, 9 of whom were re-

ferred to the Johns Hopkins Hospital before the program got under way in New York City hospitals in early 1950. This group, they said, represents 41 percent of all the children with congenital heart disease cared for by the participating hospitals during the study period. They found that 3 of the 9 participating hospitals cared for 76 percent of the children in the program. Forty-seven percent of the children received a diagnostic workup only, while 53 percent received both workup and surgery, they reported.

After each step taken in the program, the diagnosis was changed for a considerable number of children, they stated. Of the children having surgery, 23 percent were cured, 40 percent were improved, and 17 percent died. The average cost to the program per child was \$218.31; the average hospital stay, 31.9 days, 16.7 days of which were covered by the program.

### Future Needs

Analysis revealed a number of weaknesses in the program, they reported, adding that high on their list of "administrative leads" is "the need for wider dissemination of facts . . . to the professional groups and to the public," and purchase of care for patients on a cost basis. It is desirable, they said, to use current cost of living data in determining financial eligibility in a medical program of this kind.

Program policies which they felt should be reviewed and revised, include:

The present practice of payment for only one angiogram and for only one cardiac catheterization per child, exclusive of payment for the purely conservative inpatient medical care of these children, and payment of patient care on a piecemeal basis instead of a standard average fee for certain blocks of service;

Improvement in the school placement program to make more adequate information available on handicapped children, and improved case



finding in the adolescent and teenage groups;

Studies on the incidence and prevalence of handicapping conditions and total cost of care;

Finally, plans for closer review and followup of families with children who have congenital heart disease remediable by surgery, and for review of hospitals in the program.

Similar major steps should be taken in services for other handicapped children while additional studies of the congenital heart group are being made, they concluded.

## Evaluates Cardiac Clinic Serving Denver Schools

A community cardiac clinic can serve the schools—without adding to the expense and perhaps without adding to the going facilities—three representatives of the Rheumatic Fever Diagnostic Service of Denver reported in a 5-year evaluation of the project.

Presenting the paper were Georgia B. Perkins, M.D., M.P.H., formerly assistant director of the clinic and now professor of preventive medicine and public health at the University of Colorado School of Medicine; Mildred Doster, M.D., M.S.P.H., assistant director of the health services department of the Denver public schools, and H. J. Dodge, M.D., M.P.H., professor of preventive medicine and public health, University of Colorado School of Medicine.

Free discussion among those interested can lead to answers for three general questions which need to be solved before a community organizes such a clinic, they observed. These are: What are the needs of school age children? What facilities already exist? What changes or additions are feasible within established clinics which will fulfill more or all the needs of school children?

### 5 Years' Evaluation

Explaining the functions of the Rheumatic Fever Diagnostic Service, they described it as a referral

consultation service for diagnosis which is also responsible for assuring that the child is under medical care when treatment is indicated. Referrals are made by physicians or health agencies including the school health service. No charges are made.

The service, Perkins said, offers confirmatory and diagnostic help in establishing the lack of significance of functional murmurs. It provides prompt, specialized diagnoses for suspected cardiac disease and gives active assistance in placing children with rheumatic fever, rheumatic heart disease, or congenital heart disease under treatment. Evaluation of the status of known cardiac cases and advice as to the amount and kind of physical activity in which the child may engage are additional services. Any physician who desires experience in cardiac auscultation may visit the clinic.

Reviewing clinic operation from September 1948 to September 1953, the authors reported that 2 afternoon sessions were held by appointment each week and that 6 new patients and 2 revisits were the average for each session. Detailed analysis of the 2,579 new clinic cases and 804 revisits made during the period was made and data were presented in a series of tables showing:

Referral sources of new cases; children found by the clinic to have no rheumatic fever or heart disease although referred to the clinic because of a definite diagnosis; clinic diagnosis of new patients; reasons given for referrals; frequency of definite fluoroscopic and/or electrocardiographic abnormalities; and comparison of clinic diagnosis with previous diagnoses.

### Observations

"From the standpoint of the child, the most accurate cardiac diagnosis possible is absolutely essential," the authors stated. "Because of widespread existence of functional murmurs, there are numerous possibilities in almost any child for a diagnosis of heart disease to be made by someone unfamiliar with the vagaries of children's heart sounds.

Such a diagnosis can carry lifetime restrictions of a serious nature. . . . Concurrent with all of these is the possibility of a cardiac neurosis with warping of the personality and emotional development."

The report cited a larger proportion of referrals for evaluation of a murmur from the schools as "partly the result of the system of routine examinations and of other special screening physical examinations by the schools without detailed histories such as would be available to the private physician."

Comparing school referrals with those from private physicians, they said: "The school does not appear to be referring more normal cases than does the private physician. Because of the importance of proving a normal case to be normal, this should not be discouraged. It does indicate, however, that perhaps mothers are being told too often by all physicians or nurses that heart disease or rheumatic fever may be present. Being told that the referral is only for evaluation of a murmur would be less anxiety-producing."

### Special Advantages

"A diagnosis without undue delay is exceedingly important," the authors stressed. "When the child's physician feels the parents cannot afford a consultant cardiologist, or when the physician would hesitate to call in a consultant for a seemingly minor problem, this type of clinic can be of great value." In one-half to two-thirds of the cases of active rheumatic fever and in three-fourths of the cases of heart disease, the diagnosis was not made or was only suspected before the visit to the clinic, they reported.

Only 23 percent of the cases of active rheumatic fever had a certain past history of the disease, and only 35 percent of the cases of inactive rheumatic heart disease had such a history, Perkins reported. "The history, then, cannot be relied upon as a basis for referral," they said.

Also emphasized was the importance of reporting results of the clinic visits. "No reports are given

to parents," they said, but "detailed reports, which include history, physical examination, laboratory findings, and diagnostic conclusions are sent to the referring agency or physician."

Reports must be issued promptly and in sufficient detail to be of value to the physician, the authors said. The detailed report, according to Perkins and her associates, serves a triple function: as a permanent record which clarifies the significance of heart murmurs and suspected symptoms; as a teaching device for medical and school personnel working with the child and for the physician who has evaluated the child before referral; and as a "flag" for the school nurse or physician in encouraging followup wherever indicated.

### Complete Dental Care Urged For Handicapped Patients

The cause for complete dental care for seriously handicapped patients, particularly children, needs the support of the dental profession, Chester Lloyd, D.M.D., director of the postgraduate pedodontic program, University of Tennessee College of Dentistry, and a member of the staff of the Crippled Children's Hospital, Memphis, stated in his discussion of the problems involved in the management of the cerebral palsy patient.

A knowledge of the disease and its various manifestations is essential for anyone concerned with the care of the cerebral palsy patient, he stated, pointing out that the dentist must cope not only with a seriously handicapped oral mechanism, but with the general physical disturbances as well.

#### *Treatment Problems*

The greatest problem with the cerebral palsy patient, Lloyd declared, is the management of such physical manifestations as involuntary movements, rigidity, and spasticity. The procedures developed to manage best each individual patient, he outlined as follows:

For the athetosis patient, effective restraint can be obtained by specially designed belts and bands that hold the arms and legs immobile. The mouth can be propped open with wooden wedges wrapped with several layers of gauze. The operating table serves very well for patients that must be in a supine position. Because of the uncontrollable motion of the mandible and the sudden closure of the jaws, the operator must be certain that his fingers are not resting on the occlusal surfaces of the teeth. The buccal surfaces must serve as the finger rest. Contra angles and cutting instruments should be carefully controlled since sudden unexpected movements may divert them into the soft tissues. The operator must learn to "ride" his instruments with the movement of the mandible.

#### *Requirements for Success*

The primary requirement of the dentists concerned with the care of handicapped children, Lloyd maintained, is a genuine love and understanding of children combined with infinite patience. In many instances simple restorations entail long operations, and often restorations fail and must be modified or replaced. "With patience and experience, however, good dentistry can be accomplished with these children," he said.

A dental clinic for handicapped children at the Crippled Children's Hospital in Memphis, established by the Memphis Dental Society and the University of Tennessee College of Dentistry, has had a great amount of success over a 4-year period, Lloyd reported. Staffed with interns from the postgraduate department of pedodontics of the college, the clinic offers dental services to "anyone who desires it on a no-cost basis," as well as to hospital patients, he said.

He concluded that the best results in providing dental services for handicapped patients can be obtained by the association of these services with other health services. "Little can be accomplished by the dentist working alone," he said.

### Special Health Classes Not Always Necessary

Many children in special cardiac, orthopedic, and sight conservation and Braille classes in New York City are inappropriately placed from the medical viewpoint, according to Helen M. Wallace, M.D., M.P.H., director, Bureau of Handicapped Children, New York City Department of Health; J. Wayne Wrightstone, Ph.D., director, Bureau of Educational Research, New York City Board of Education; and Elena Gall, D.Ed., coordinator of special education, Hunter College.

This conclusion was implied in the findings made from studies of children in special health classes during 1951-53 by the Bureau of Educational Research of the New York City Board of Education, the authors indicated, citing as specific examples of inappropriate placement the 88 percent among 74 children studied in heart disease classes, 32 percent among 182 children studied in sight conservation and Braille classes, and 31 percent among the 49 studied in orthopedic classes.

#### *Placement Principles*

Summarizing 10 specific principles of placement, they said:

1. Special classes should be provided for children who need them and who otherwise could not attend school.

2. Special classes should meet the individual needs of each child by providing the essential health, educational, and transportation services, and vocational guidance.

3. Medical criteria to guide physicians caring for handicapped children should be established by medical experts for the admission, placement renewal, and discharge procedures.

4. Children should be placed in special classes and their placement renewed only upon the recommendation of qualified medical specialists in consultation with education and psychological specialists, but where this is not practical, a handicapped children's program should provide

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supportive diagnostic and consultation services for the practicing physician and his patients.

5. The provision of special classes necessitates well-qualified medical specialists who understand school conditions and activities—school physicians, public health nurses, classroom teachers, and the various ancillary specialists.

6. Special classes should be looked on as one unit of the general school program, should be integrated into the regular school curriculum, and should provide for the degree in regular school activities which is warranted by the physical condition of the children.

7. There should be close liaison between the special classes, the individual practicing physician, and the various medical treatment agencies in the community.

8. Opportunity should be created for parent education and participation.

9. A good record system is necessary so that all members of the medical team participating in the special class activities will have access to adequate data on each child's physical progress and emotional adjustment.

10. There should be adequate and easily accessible physical facilities for easy mobility of the children, special equipment, single-floor school buildings if possible, otherwise, elevators and ramps.

### *Special Recommendations*

Since most physically handicapped children will, upon maturity, participate in community life, the development of personality traits for a shared social life is not helped by living apart from normal children, the authors stated. Handicapped children should participate as much as possible in normal school activities, they said. The primary objective of special classes should be to return as many children as possible to regular classes as soon as possible, they said.

Although there is more opportunity to concentrate the services of physicians, nurses, therapists, and teach-

ers in the small special classes, segregation of the handicapped child may have an adverse psychological effect on him, Wallace and her associates suggested. Segregation also provides less opportunity for normal children to develop understanding of handicapped children, they pointed out. They cited as other disadvantages, the cost of educating children in segregated classes and the possibility of inappropriate placement which might mean that some children may be "lost forever."

"Special health classes have a tendency at present to become a wastebasket for some children in a school who are thought to be socially unacceptable or mentally retarded," they stated. "This, however, reflects the general need for additional adequate community services for both of these latter groups of children."

Special classes in the public schools for blind, deaf, and mentally retarded children should be continued on a modified basis "with considerable opportunity for mixing in many of the school activities with normal children," they said. Severely physically disabled children

should also have special classes, they added.

For other types of handicapped children, the authors suggested a flexible arrangement whereby children with any type of health problem requiring modification of the school program may be placed temporarily in one room. An attempt should be made through carefully planned studies comparing the education of handicapped children in special and in regular classes to secure some final answers to "this somewhat controversial" subject, they concluded.

### **Cerebral Palsy Reporting Appraised in New York**

At a session on the topic of handicapped children held jointly with the American School Health Association, the mandatory reporting of cerebral palsy in New York State was critically appraised by three representatives of the division of medical services, New York State Department of Health.

Edward R. Schlesinger, M.D.,

**Reported cases of cerebral palsy under 18 years of age at time of report, by source and year of report, upstate New York,<sup>1</sup> 1950-52**

Source of report	All years		Year					
			1950		1951		1952	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Cerebral palsy centers <sup>2</sup> -----	1,842	56	1,141	50	316	68	385	68
Private physicians-----	133	4	105	5	17	4	11	2
State institutions <sup>3</sup> -----	509	15	440	19	27	6	42	8
Orthopedic clinic and others <sup>4</sup> -----	815	25	593	26	102	22	120	22
All sources-----	3,299	100	2,279	100	462	100	558	100

<sup>1</sup> Residents of New York State exclusive of New York City.

<sup>2</sup> Cerebral palsy diagnostic and treatment centers; special cerebral palsy outpatient departments of hospitals; cerebral palsy school classes; and cerebral palsy screening clinics.

<sup>3</sup> State schools and other institutions for mentally retarded children.

<sup>4</sup> Includes orthopedic clinics and child guidance clinics.



M.P.H., associate director, Helen C. Chase, M.S., biostatistician, and Clark LeBoeuf, B.S., administrative assistant, presented the report.

Cerebral palsy has been reportable in upstate New York (the State exclusive of New York City) since January 1, 1950. Physicians are required to report all cerebral palsy cases under 18 years and under their care to the appropriate full-time health officer, the authors stated. From 1950 through 1952, 4,375 cases were reported; evaluation of experience with the reporting procedure, however, was based on the 3,299 cases under 18 at the time of the study.

### *Objectives Assessed*

Since the law requiring mandatory reporting gave no indication of its purposes, the evaluation was made, the authors explained, in terms of these specific objectives:

To promote early case finding, so that patients with cerebral palsy might secure maximum benefit from available facilities;

To obtain descriptive information on individual patients for program planning and research purposes;

And to secure information of value for epidemiological study.

These objectives were not attained, they indicated in reviewing the results:

Mandatory reporting of cerebral palsy does not appear to be an effective case-finding technique for promoting earlier use of available facilities—only 4 percent of initial case reports were submitted by private physicians (see table). The low rate of reporting, however, may have been due mainly to the physician's expectation that cases would be reported by the community agencies seeing the children in consultation or in the provision of therapeutic or rehabilitative services.

The system did not provide information of value in planning or evaluating health services. The reasons given were unavailability of certain information, such as intelligence levels, and the incomplete and conflicting nature of information

on the extent and types of physical involvement.

Difficulties were encountered in interpreting the epidemiological data obtained, which were not helpful in explaining the differences in prevalence rates found in various surveys in New York State or elsewhere.

Essentially the same information could, therefore, have been obtained, if desired, the authors stressed, from summary reports submitted periodically by the community health agencies without resort to a cumbersome, expensive, and time-consuming universal reporting system.

## Laboratory and Control Aspects Of Venereal Disease

*The epidemiology section of the APHA was reminded that organized efforts are still required to control the venereal diseases, and the laboratory section heard a report on the use of leprosy serums to differentiate syphilitic and nonsyphilitic reactions in serologic tests for syphilis. The Conference of State and Provincial Public Health Laboratories was told of the services provided by the Public Health Service Venereal Disease Research Laboratory to State laboratories in their syphilis serology programs, of the relationship between State and Territorial laboratories to local laboratories within their borders, and of the change in emphasis in syphilis serology.*

### **Venereal Diseases Not Yet Treated Out of Existence**

"Let us not delude ourselves that venereal disease can be easily treated out of existence, or that an organized control effort is an anachronism," James K. Shafer, M.D., chief of the Division of Venereal Disease, Public Health Service, warned. He emphasized that with some 255,000 infectious cases reported in 1953, an organized public health effort, including alert epidemiological services, is required to control these diseases.

Syphilis, like all other diseases, has frustrating epidemiological problems, Shafer continued. Special approaches and techniques must be used by interviewers of venereal disease patients. However, he stressed that the basic principle of interview-

ing is to obtain names and addresses of contacts. Courses in interviewing techniques greatly increase the yield of contacts per interview, he said.

Contact information must have free, but confidential, transit between health jurisdictions, Shafer continued. A standard multiple epidemiological form is now widely used between the States and between military and civilian control operations.

It is estimated that there are 2,000,000 cases of undiscovered or inadequately treated syphilis in this country, the speaker stated. Data now on hand indicate that without treatment, 12 percent of these cases will proceed to disability or death from syphilis, he said. Lack of treatment reduces life expectancy of the syphilitic by 17 percent. Furthermore, in a 20-year study conducted by the Division of Venereal

## LEPROSY SERUMS

Disease, 40 to 60 percent of persons with untreated syphilis were found at autopsy to have involvement of the cardiovascular system.

### Gonorrhea Case Finding

For several reasons, epidemiological efforts in the past have been directed principally at syphilis, Shafer said. Syphilis was considered to be the more serious disease, and it was felt "that the discomfort experienced by the male gonorrhea patient would cause him to volunteer for medical care." Also, penicillin has become increasingly available; and since it was specific for gonorrhea, it was expected that the disease would tend to be "treated out of existence."

This has not happened, Shafer said, and since syphilis rates in some places have declined to where they can be held in check, a greater share of case-finding efforts can be devoted to gonorrhea.

Venereal disease control workers are attempting to attack the disease at the point of "epidemiologic vulnerability." Efforts are made to locate female contacts of male patients within a period beginning 6 days before the onset of the male patients' clinical symptoms and ending at the time of the appearance of the patients in the clinic. Only contacts during this period are searched for, and speedy investigation is essential. The speaker stated that early reports of results obtained by this method are encouraging—about 70 percent of the contacts identified are being brought to examination and treatment within 5 working days.

### Use of Leprosy Serums In Differential VD Test

A procedure, based on the application of choline chloride, for the differentiation of syphilitic and nonsyphilitic reactions obtained in serologic tests for syphilis, using leprosy serums, was reported by three Public Health Service investigators. The study was made by Joseph Portnoy, Ph.D., Walter F. Edmundson,

M.D., and Sidney Olansky, M.D., assistant chief of the clinical investigations section, associate director, and director, respectively, of the Public Health Service's Venereal Disease Research Laboratory, Chamblee, Ga.

Serologic tests for syphilis (STS), which utilize lipid antigens, may show positive reactions in the absence of syphilitic disease, past or present, they said, in opening their discussion.

A nationwide campaign against venereal disease in the last decade has markedly reduced the incidence of clinically recognizable syphilis, and this reduction, in their opinion, has meant an apparent increase in the number of nonsyphilitic reactors to STS and has also resulted in greater reliance on the reactions to these tests.

They said that attempts have been made to improve the specificity of the STS by purification of the antigen and by the development of differential or verification procedures. Purification of the antigens used has resulted in "relative improvement" of the STS, but positive reactions unrelated to syphilis are still observed, according to Portnoy and his associates. The purported merits of differential or verification procedures have not been substantiated, they felt.

The specificity of their new dif-

ferential method, based on the use of choline chloride, was determined by checking the results obtained by this procedure with clinical findings and with the results of the treponemal immobilization (TPI) test, they said.

### Effect of Leprosy

A high percentage of positive reactions in STS has been observed in leprosy patients, according to the authors. Because of this, it "appeared advisable," they said, to use the serums of leprosy patients to determine the suitability of the new differential method before beginning a study of nonsyphilitic reactors due to other causes.

"The differential procedure involves the preparation of two antigen suspensions from VDRL slide test basic antigen," they said. "The antigen suspensions . . . differ only in the presence or absence of choline chloride," they reported. "With antigen suspensions containing choline chloride," the investigators said, serums of syphilitics (with or without leprosy) "show an augmentation of seroreactivity," whereas nonsyphilitic reactive leprosy serums show a diminution of seroreactivity."

In a discussion of the accompanying table which summarizes a comparison between the results obtained with the differential procedure and

Comparison of results obtained with the TPI test and with the differential procedure

Clinical status	Number of cases	TPI test		Differential procedure <sup>1</sup>		
		Re-active	Nonre-active	S	NS	NR
Normal	84	1	83			1
Primary and secondary syphilis	87	58	29	53	3	2
Late and late latent syphilis	54	54		11	1	17
Leprosy, clinical evidence of syphilis	14	9		53		1
Leprosy, no clinical evidence of syphilis	241	21	5	6	2	1
				15	3	4
			220	67		3
						153

<sup>1</sup> S—Syphilitic type reaction. NS—Nonsyphilitic type reaction. NR—Nonreactive.

those attained by the TPI test, the speakers called attention to the frequent nonreactivity of the TPI test in early syphilitic infection. These discrepancies, they said, and corresponding variations in the differential procedure "do not indicate error of either test but are dependent upon the testing procedure used to indicate the presence of different antibodies appearing at different times in the disease process and the individual antibody response."

The group reported a good correlation, on the basis of clinical and historical evidence, between the differential procedure and the TPI test results in normal persons and in syphilitic, nonleprosy individuals. The new method compared favorably with the TPI test in leprosy patients with and without clinical or historical evidence of syphilis, they continued.

The investigators concluded by saying, "The differential procedure described in this report is not recommended for general use. Studies are in progress to determine the behavior of the test in other disease conditions."

### Shift of Emphasis on STS By State Laboratories

State and Territorial laboratories are acting more as reference laboratories and training centers to serve the needs of their own States. Two members of the staff of the Venereal Disease Research Laboratory, Public Health Service, reported results of a survey made in 1952 and 1953 to the Conference of State and Provincial Public Health Laboratory Directors.

Ad Harris, assistant director of the laboratory, and Genevieve W. Stout, head of its field service unit, said that ideally, the State laboratory should serve in the same capacity in relation to laboratories operating within the State as the VDRL serves nationally in relation to State laboratories.

State laboratories perform blood tests required by law, as for premarital and prenatal examinations, tests to aid in diagnosis and in treatment control, and tests for confirmation and control of results in local laboratories, the researchers said. Standardized antigens are also prepared and distributed by about half the State laboratories surveyed, and in a number using commercial antigens, the latter are checked against reference antigens before use. While used in varying ways, control serums were employed in all but seven laboratories. Thirty-eight States now have an evaluation service.

Continuous surveys, during which the control laboratory provides participating laboratories with periodic reports of results of tests, afford the latter an opportunity to take any necessary corrective measures and enable the State laboratory to offer technical assistance and training, they continued. Visits to participating laboratories are valuable not only in improving public relations between the State laboratory and local laboratories, they stated.

### Training and Standardization

Technicians from affiliated universities and approved laboratory training schools are receiving training in syphilis serology at State laboratories, Harris and Stout said, and in some States, refresher courses have been conducted in the field.

A continuous standardization program of personnel training, improvement in quality of test antigens, consultation services in connection with technical programs, and evaluation of test performance have resulted in generally satisfactory performance of serologic tests for syphilis in State laboratories, they stated.

"State programs are reflecting the results obtained in the national program," Harris and Stout reported, adding that intrastate standardization is more difficult. Although efforts of State laboratories are hampered by limitations of budget, personnel, and time, it is expected that they will continue to develop

and improve intrastate standardization programs. By so doing, gains will be consolidated and progress made "toward a goal of dependable syphilis serology in all laboratories under their jurisdiction," they concluded.

### VDRL Cooperates With State Laboratories

For more than 15 years the Public Health Service Venereal Disease Research Laboratory at Chamblee, Ga., has extended services to State laboratories in syphilis serology programs, Ad Harris, assistant director, and Sidney Olansky, director of the laboratory, reported to the Conference of State and Provincial Public Health Laboratory Directors. The objective, they said, is to make available a federally supported service to assist State venereal disease control programs when such a service is not provided by the States.

Formal training courses in the serology of venereal diseases are offered at Chamblee. During the last two years, these have been attended by representatives of most of the State laboratories. In 1953, all applications could not be accepted, they said, and the class schedule for fiscal 1954 has been increased by approximately 50 percent.

Dehydrated control serum is supplied to the State laboratories upon request, they reported, and added that the VDRL serves as a joint control for intrastate serologic evaluation studies and as a control in the National Serologic Evaluation Study for the VDRL tests, Harris and Olansky continued. In the intrastate serologic surveys, the number and kinds of tests performed on each specimen are determined by the requests from the State laboratories. In mass-testing surveys, or when a State venereal disease control program requires testing a larger number of specimens than the State laboratory can take care of, the specimens are sent to the Venereal Disease Research Laboratory.



## Consultation Services

On request of a State laboratory or a branch laboratory, a VDRL representative will review the activities of the serology section and provide consultation on program development or solution of problems in the venereal disease control program. Advice is given on both bench and operational problems, they said. VDRL representatives participate in field refresher courses, workshops, and other meetings held by State

groups. This participation, in addition to refresher training, establishes "a closer working relationship between the State laboratory and other laboratories within the State." The VDRL also prepares laboratory manuals and makes comparative evaluations of newer testing procedures.

This program has been kept flexible, Harris and Olansky concluded, so that changing needs can be met. Future services will be determined by the requests received from State laboratories.

ous physiological changes or stresses such as those occurring during pregnancy. Such conditions may make a portion of the population peculiarly susceptible to a particular food additive, he pointed out.

## Differ From Therapeutic Agents

The considerations in relation to non-nutritive additives in foods, therefore, differ from the considerations which determine whether or not a therapeutic agent shall be used in treating a sick person, Darby specified. A report of the Food Protection Committee of the National Research Council's Food and Nutrition Board expressed it this way, he said:

"Were the additive in question a therapeutic agent, the appraisal of toxicological data might be essentially a decision between two threats to health, viz, a hazard of the untreated disease and the risk involved in treatment. As the necessity . . . for use becomes less apparent, the margin of safety demanded must be increased proportionately until, at the point where there are no benefits . . . directly referable to the maintenance of or restoration of health, the justifiable risk approaches zero. Then the exercise of conservative judgment requires the demonstration of safety beyond any reasonable doubt."

## Other Nutrition Questions

Other questions, Darby said, of concern to the nutritionist include whether an additive aids in preserving or destroying nutrients present in the food; whether or not the additive replaces nutrients commonly associated with a particular food; and whether or not the additive itself has nutritive value.

## Reviews FDA Position On Food Additives

"There is no easy or simple solution to the problem of chemical additives. Its ramifications are so extensive, the quest for facts on which

# Opinions on Chemicals in Food And Food Sanitation Problems

*No easy solution to the complex problem of chemicals used as additives in food was advanced in any of the viewpoints expressed by six participants in a panel discussion on the subject before the food and nutrition section. The nutritionist, the Food and Drug Administration, the laboratory technician and toxicologist, and an attorney presented their papers for review on these pages. The viewpoint of the manufacturer and the opinions of a consulting chemist were not made available in time. The use of the laboratory in investigating food-poisoning cases and the coordination of unofficial agency food sanitation programs with official programs were discussed before a joint session of the food and nutrition and the engineering sections.*

## Possible Chronic Effect Of Additives Cited

In evaluating the suitability of chemical additives in foods for human consumption, the possibility of long-term chronic toxicity related to all ages must be considered, declared William J. Darby, M.D., Ph.D., professor of biochemistry and director of the division of nutrition, Vanderbilt University School of Medicine.

"Certain additives," he pointed out, "have a potentially wide spectrum of use in foodstuffs—so wide

that they may enter one or more items which are habitual parts of the daily diet of every individual throughout life."

Another consideration is the composition of the population that will consume the food, he maintained, noting that those who consume a product are not always those for whom the product was initially intended. When the entire population is likely to be involved, he said, a sizable portion of the population may be suffering from temporary or chronic illness, recognized or unrecognized, or may be undergoing vari-

to base sound conclusions so complicated, and the stakes in terms of health and well-being of the individual and of the Nation so enormous that we are apt to be overwhelmed by our joint responsibility in finding the proper solution," stated Charles A. Herrmann, B.S., chief of the New York District, Food and Drug Administration, Department of Health, Education, and Welfare, in explaining the Food and Drug Administration viewpoint on "regulation of food additives."

The Federal Food, Drug, and Cosmetic Act makes a distinction between substances which may be present naturally and substances which may be added to food and considers food adulterated "only if the quantity of the poisonous substance in the food ordinarily renders it injurious to health," Herrmann continued.

The Food and Drug Administration prefers to consider its role in the field of chemical additives as "a challenge to the reconciling of the equities of the food producer and handler with the interests of all of us as food consumers," he stated.

### *A Host of "Improvers"*

The research required to set safe legal tolerance limits for the approximately 22,000 registered food additives which represent about 125 basic chemicals is beyond the present resources of the Federal agency, he stated.

Nor is there at present any "legal compulsion" that the new additives—the anti-oxidants, stabilizers, plasticizers, preservatives, softeners, emulsifiers, and other "improvers"—be tested for safety before being introduced, Herrmann stated. "There is no law against using the consumer as a human guinea pig."

Although coumarin has been used as a flavoring agent for 75 years, it was not until May 1953 that primary manufacturers produced pharmacological evidence of its effect on animals as "comparable to what may occur in human diet," he said. How many other commonly accepted food ingredients might similarly be stig-

matized, he said, raises "disquieting suspicions."

The presumed safety of 428 chemicals for normal use and the undetermined safety of the remainder of the 704 chemicals used in food were questioned at the 1953 Annual Conference of the Association of Food and Drug Officials of the United States, he said.

### *Remedial Steps*

The Federal agency, Herrmann said, favors "some sort of procedure similar" to the new drug provisions of the Federal Food, Drug, and Cosmetic Act, which require the filing of an application listing full investigation reports of the new drug, a statement of composition, and a description of the manufacturing and packing methods as well as detailed recommendations for dosage, intended use and contraindications and warnings where required. A similar procedure for food additives would place on the manufacturer the primary responsibility of investigating the safety of a new chemical additive before it is admitted as an ingredient of food, he indicated. Poisonous substances, even in nontoxic amounts, should not be added to the food supply unless they are really necessary to its production or cannot be avoided by good practice, he stated, and even then, the amount should be noninjurious and held to a minimum.

A guarantee of absolute safety for all people under all circumstances is as serious for food additives as for new drugs, he felt. If the safety of a new food additive has been proved with no adverse results, the product should be cleared for safe use, but "its use in the food supply should be watched," and when the item is believed harmful, it should be reinvestigated, reappraised, and "if the facts warrant, its clearance for use in foods should be canceled," he cautioned.

Basic investigations for judging the safety of new chemical additives should include, Herrmann suggested, (1) establishment of the chemical identity and analytical methods of detection, identification, and quantitative estimation of the proposed ad-

ditive; (2) investigation of acute toxicity in test animals which should not be limited to rodent species; and (3) study of subacute and chronic toxicity effects including both growth, mortality, and reproduction patterns and blood level studies, metabolic fate of the compound, examination of organs and tissues, and similar criteria.

### **Toxicologists' Tasks Need Defining**

The public, not the toxicologist, must eventually answer the question of whether the risks involved in translating experimental observations of toxicity of chemical additives to food are "more than balanced by the potential benefits to health, dietary variety, world food supplies, esthetics, economy, and other factors involving social and cultural, as well as nutritional considerations," stated Bernard L. Oser, Ph.D., vice president and director of Food Research Laboratories, Long Island City, N. Y.

Many chemical and technological factors must be considered in establishing test conditions for laboratory investigations of food additives, Oser continued. Analytical procedures for determining the test substance in the foods at the levels proposed for use must be developed; the food must contain concentrations of the test substance that are compatible with maintaining the identity of the food and with its acceptance by the test animal; and similar nonbiological problems must be solved.

### *Test Diets and Test Levels*

Two questions confront the toxicologist, the speaker said. What shall the test diet contain? What shall the test levels be? He felt that the test diet should be patterned after the "normal diet" of the human population since such a diet is the medium in which the food additive will be consumed. Oser stated that when the term "poisonous or deleterious substance" is interpreted in the

light of possible harm to public health, test levels of substances to be investigated can be determined by consideration of the amounts to be used, after due allowances for margins of safety. But, when the term is interpreted in the absolute sense, determination of test level dosage is more difficult.

"Measurements of relative degrees of toxicity . . . under specified conditions of administration is a relatively simple matter, as long as recognizable effects can be induced in laboratory animals," Oser maintained. "But when the effects are obscure, subtle or unrecognizable, even at dose levels many times those expected to be encountered in practice, it becomes difficult, if not impossible, to draw conclusions as to safety with the degree of assurance demanded in certain quarters."

Oser continued with a brief coverage of some of the difficulties encountered in testing, such as whether the criterion of toxicity of a single massive dose administered intragastrically to fasted animals is preferable to a few weeks' controlled feeding of the test substance in the diet, the deviations occurring in apparently normal colonies of animals, and the incidence of renal calculi in so-called normal or control animals.

### *Placing Responsibility*

Factors of human judgment influence the evaluations on which the decision to use a food additive must rest, Oser declared, no matter how carefully the experiments are planned and executed. Differences in interpretation will occur, and when they do, "scientific judgment must supplement factual observation and statistical analysis," he said.

The question remains, he said, whether it is appropriate to use normal diets as the basis for evaluating the safety of food additives. Should the food consumption patterns of the economically depressed, of diabetics, of hypertensives, of various national groups, of the aged, of faddists be calculated, he asked, adding that some general understanding is

needed as to where the responsibility of the food industry towards consumers generally ends and where the responsibility of the individual and of the medical profession begins.

"If it is to be within the province of the toxicologist to assure the food manufacturer and the government, representing the public, that a food additive is safe for all segments of the population, under all dietary patterns, in disease as well as in health, he has an infinitely larger assignment than is currently realized or practically attainable," Oser maintained.

### **Food Additive Controls Needed, Says Attorney**

The pretesting of chemicals proposed for use in or on foods may soon be required by law, according to Vincent A. Kleinfeld, LL.B., formerly special assistant in charge of food and drug litigation to the United States Attorney General, now in private practice, Washington, D. C.

"In view of the serious nature of the problem and the alarm evinced by those qualified to render expert opinions, is it asking too much of the manufacturer of a substance which is to be used in a wide variety of foods and consumed by people in all walks of life and in various degrees of health to submit evidence that the product does not present a hazard?" questioned the attorney. "If this is not done, is not the consumer an unwitting guinea pig, upon whom experimental work is being conducted?" He declared that if this premise is accepted, there is little doubt that additional control will come to pass.

Kleinfeld explained that the Federal Food, Drug, and Cosmetic Act permits exclusion of additives, safety of which is not firmly established, from foods which are standardized by the Food and Drug Administration but that most foods are not, and may never be, standardized. Consequently, he said, a substance the safety of which has not been demon-

strated may be utilized because it cannot be proved to the satisfaction of a court and jury that it may be poisonous or deleterious.

### *Serious Problems Created*

The use of chemicals in or on foods has frequently served a valuable function as far as the consumer is concerned, the attorney pointed out, but the fact remains that serious problems have arisen.

There has been considerable testimony in hearings before congressional committees from qualified persons that a definite health hazard may be created by the ingestion over long periods of time of many substances which may not present any acute danger when consumed in minute quantities, he noted. He also declared that there is considerable evidence that some of the newer substances presently in use have not undergone comprehensive testing.

Nor, he continued, is it entirely safe to assume a substance free from hazards on the basis of long usage or on studies of vital statistics. "The subtle, insidious effects of a substance upon a limited number of persons, particularly when consumed over long periods of time, may not be readily recognized," he said.

Kleinfeld considered it imperative from the viewpoints of both industry and the public, "that a solution be reached and an umpire chosen before some incident with serious consequences occurs."

### **States Six Prerequisites For Cooperative Action**

Six prerequisites for cooperative programs were outlined by James A. King, Jr., M.P.H., training officer of the Communicable Disease Center, Public Health Service, in speaking on the coordination of food sanitation programs.

Leaders of different agencies who are interested in joint action in solving a problem must turn their attention to people to get results, he said. People must perceive and be



concerned about the problem, King said; they must see it as their own; believe it can be solved; accept the method of solution; perceive themselves as having a part in making the decision; and these perceptions must follow the leadership and communication patterns and the values of the people concerned.

#### *Ask "Little Joe"*

In gaining support of individuals for an idea, King indicated that the "Little Joe" in an organization may be as important as the recognized leader. He is the one to whom others look for advice and whose opinions or behavior are most respected and valued, he explained. "Since virtually all organizations have their Little Joes, it behooves those who seek coordination to spend some time early in their planning in an effort to achieve mutual understanding with these individuals as well as with recognized leaders," he said.

While individuals may be approached to determine initial interest, King believes that group action is advisable in seeking an acceptable solution to a problem that concerns a number of agencies. Five agencies might propose five different solutions, he explained, stating that resolving these differences is highly difficult on an individual basis.

#### *Planning Group Action*

In planning for group action determination of who should initiate a meeting, agencies to be invited, purpose of the meeting, and attitude of the leaders are important, King said.

Each agency should be given equal opportunity and credit, he said. As an example, "Midland County Health Department Sponsors Inter-agency Meeting," he said, is less acceptable than "Twelve Agencies Met Today to Consider Ways of Achieving Better Food Sanitation." Exclusive publicity for one agency as the sponsor may alienate the others, he said.

Individuals or independent agencies expected to cooperate must be part of the initial planning, King

said. A restaurant association, he explained, cannot be expected to cooperate enthusiastically in a new food sanitation program that has been planned without its cooperation.

The real purpose of a joint meeting is to lay the cornerstone for cooperation, King said. In achieving this purpose it is necessary that participants consider the need for cooperation, determine if the problem is their own and if it can be solved, and decide the next steps to be taken in achieving results, he declared.

The attitude of the leader, King suggested, should be that of bidding for cooperation in solving common problems by working together. Research indicates that decisions made by the group are from 2 to 10 times as effective in producing results as is a lecture involving exhortation toward an objective, he said.

#### **Urges Use of Technicians In Food Poison Cases**

Crediting much of the advance in public health in the past 50 years to the team approach, Henry E. Drumwright, B.S., chief of public health inspection services, Dallas (Texas) City Health Department, recommended including a laboratory technician as a working member of the physician-sanitarian-technician team investigating food-poisoning cases.

Sending a laboratory technician, along with the sanitarian, to the suspect establishment to collect food samples makes it possible for the technician to see the conditions prevailing in the establishment and to obtain a better understanding of the existing problems, he specified.

"The legal aspects of food-poisoning investigational cases will also be improved," he added, since the technician can present to the court samples which have remained in his possession until analysis was complete.

Normally, the laboratory and its technicians are considered as a means of control and research, he pointed out, giving as an example

the swab test, which is used to check equipment and dishwashing techniques as well as to identify bacteria.

#### *Immediate Survey*

Drumwright favored an immediate environmental survey of the establishment involved in food-poisoning cases. Even though the epidemiological data is incomplete, much valuable information about the food preparation, food service, food handlers, and the suspected food will be overlooked and in many cases will be entirely lost without this, he said. On the basis of this assumption, it will be necessary for a sanitarian and a laboratory technician to visit the food establishment together, he maintained.

Drumwright recognized that this method of investigation could not be used by all health departments, since many do not have easy access to a public health laboratory. It would also be difficult, he noted, for the central laboratory of a State health department to put this method into operation. He recommended, however, that a central laboratory send a highly trained technician to the scene, even if distance is great, when investigational work would include suspected chemical poisoning along with food intoxication.

#### **Links Character of Diet To Heart Disease**

"The general mortality picture for adults in the United States is less favorable than in many European countries," a joint session of the epidemiology, food and nutrition, industrial hygiene, and statistics sections of the APHA and the American Association of Registration Executives was told. "Men, and to a smaller extent, women, in the United States have a grossly excessive incidence and mortality from coronary and degenerative heart disease in general."

The speaker was Ancel Keys, Ph.D., professor and director of the laboratory of physiological hygiene, School

of Public Health, University of Minnesota. "The relatively thin Englishmen have less heart disease and less coronary disease than Americans at the same age," he added, but the "relatively fat Italians are even more fortunate than the Englishmen." However, the character of the diet, as much as the amount of the diet, is a factor in obesity, and it influences cholesterol level, which seems to be related to mortality rates for coronary and for all heart diseases in the countries where studies have been made, Keys said.

## Overweight vs. Overfat

"Overweight" and "overfat" are not synonymous, Keys stated. "Overweight per se, except when it is of extreme degree, is not a primary cause of coronary disease and the myocardial disorder to which it gives rise," he continued. However, "there is some evidence that being overweight may contribute to the development of hypertensive disease." He pointed out that insurance companies treat weight as a single entity, but fat and muscle represent almost opposite extremes metabolically. However, he felt that anyone 30 per-

cent or more overweight is likely to be overfat.

Keys cited results of several studies of various age and occupation groups and then stated, "I have no doubt that heart disease, in general, is unduly frequent, or at least mortality from these causes is higher, in persons who are 50 or more pounds heavier than the general population average. But whether this relationship holds for smaller degrees of overweight is certainly debatable."

## Dieting

Reduction in food consumption alone will not reduce the mortality from heart disease in this country to the level of heart disease mortality in countries with lower rates, the speaker said, although dieting to lose weight is highly desirable in cases of true obesity. It is important that a more detailed analysis of the evidence be made and that the role of physical activity be studied, he said.

The distinction between overweight and overfat must be made in future researches and "it is imperative to distinguish between the atherosclerotic process and the clinical picture," he concluded.

ease eventually come, they will remain unacceptable until they have stood the test of consistency with epidemiological facts, Gilliam stated.

## Defining "Incidence"

Epidemiology differs from other medical sciences in that its universe is human society or selected segments of it, rather than individuals, Gilliam said. "Descriptive epidemiology," he continued, characterizes the kinds of people who acquire or escape disease and enumerates factors related to disease. "Determinative epidemiology," he said, tests in human experience inferences drawn from the evidence of descriptive epidemiology or from other bodies of knowledge and attempts to define factors which govern the occurrence of disease.

"The initial effort of descriptive epidemiology is to measure risk in groups of people with different characteristics," Gilliam said, noting that risk is measured through computation of incidence.

Since data are so often labeled "incidence" when they may not even reflect it, and conclusions are then drawn which would be valid only if the data did represent true incidence, Gilliam said that agreement on the meaning of the word is "more than a question of semantics." The "population at risk," all cases or deaths occurring in the population, and a specified period of time are the three elements entering into the computation of incidence, he continued, defining the term as "the rate of occurrence or diagnosis of disease, or death, per unit of population during a period of time." It is still good usage to apply it to death data, he said.

Although there is abundant precedent in respectable medical literature for using "incidence" to describe data other than those representing probability of occurrence, such misuse is mainly responsible for much confusion in the epidemiology of many noncommunicable diseases, he said. Authors almost invariably label as incidence, he added, the ratio of one disease to the total when the ratio is instead a relative frequency

# Influenza, Histoplasmosis, and Other Epidemiological Studies

*Incisive definitions of descriptive epidemiology and determinative epidemiology were offered to a joint session of the epidemiology, food and nutrition, statistics, and industrial hygiene sections. The same speaker also outlined the epidemiological method in noncommunicable disease. From the influenza front came three reports, one noting the appearance of an unknown entity in respiratory illness at a military installation and another reporting on the efficacy of specific vaccines.*

## Finds Etiological Clues In Consistent Data

Descriptive epidemiology should direct attention to population segments in which greatest returns from control measures might be expected,

Alexander G. Gilliam, M.D., chief, Epidemiology Section, National Cancer Institute, Public Health Service, told a joint meeting with the American Association of Registration Executives.

But from whatever scientific discipline the clues to etiology of dis-

which cannot reflect or measure incidence, unless a number of other conditions are satisfied, Gilliam stressed.

"The bulk of evidence of descriptive epidemiology which is presently available for noncommunicable disease has been derived through application of some variant of the case history or population methods of study," Gilliam stated. "For most of these diseases, by far the largest proportion of the evidence has been acquired through case history investigation."

The two methods differ not only in the detailed procedures they employ, but more importantly in the confidence which may be placed in evidence through their use, he continued. Calling the "case history method," a technique best accepted "with reserve" because the security of case history evidence depends heavily on selective factors which determine the representativeness of the samples of cases and controls, he defined it as the procedure which has as its point of departure "records of a group of cases of a disease." The "population methods," he said, uses a group of people for its point of departure.

One of the primary deterrents to effective use of the epidemiological method is inherent in the difficulties encountered in dividing the population into those who do and those who don't have the disease under study, he indicated.

"If the disease in all of its stages can be accurately diagnosed by the average practitioner on clinical grounds, then no difficulty is encountered," he said, adding that if specialist care, hospitalization, laboratory procedure, or autopsy are necessary, a number of cases will go unrecognized.

"Until adequate access can be had to data on noncommunicable disease as it occurs in definable populations, substitute procedures for estimating them will continue to be employed," Gilliam concluded. The vital point at issue in methodology, he added, is whether in attempting to measure

risk "we need or need not account for changes of patient attributes with time."

### Unknown Entity Observed In Respiratory Illness

At Fort Leonard Wood, Mo., during the epidemic of acute respiratory diseases in November and December 1952 and January 1953, laboratory studies indicated that, although influenza was present, an unknown entity was responsible for much of the morbidity, stated Maurice R. Hilleman, Ph.D., assistant chief of the department of virus and rickettsial diseases, Army Medical Service Graduate School, Walter Reed Army Medical Center, Washington, D. C., and C. V. Adair, MC, also a member of the department.

Isolations of influenza virus were made from 7 out of 13 pharyngeal washings (54 percent) collected on December 18 and 19, they reported, but 2 weeks later, between January 4 and 9, only 1 out of 76 attempts (1 percent) to isolate virus was successful. A similar variation was found in the proportion of paired serums from cases which showed diagnostic rises in antibody for influenza when tested by the hemagglutination-inhibition technique, they said.

Also suggesting the presence of some clinical entity in addition to influenza was the fact that, during the major wave of the epidemic, attack rates were consistently 2 to 5 times higher among the men receiving training than among the permanent personnel, the researchers pointed out. About two-thirds of the soldiers stationed at Fort Leonard Wood during the epidemic were receiving training, they said.

### Cases Resemble ARD

In summation of the findings, the researchers said the cases of noninfluenzal illness without pneumonitis resembled the undifferentiated acute respiratory disease (ARD) which was prevalent in military populations during World War II and

which was studied intensively by members of the Commission on Acute Respiratory Diseases. Like ARD, they noted, the disease at Fort Leonard Wood was mainly one of the recruit population and bore close resemblance to the so-called viroid, grip, or febrile catarrh observed in civilian populations.

Clinically, however, the investigators continued, the disease in the Fort Leonard Wood epidemic appeared to be more severe than has been reported by the Commission on Acute Respiratory Diseases. The commission considered ARD a mild disease of short duration, whereas the Fort Leonard Wood illness was moderately severe and required an average of 14 days hospitalization.

The cases of noninfluenzal illness with pneumonitis clinically resembled the cases which failed to present pulmonary involvement as a feature of the illness, they explained. They concluded, therefore, that in the absence of definitive information regarding the etiological factors involved it appeared reasonable to assume that the pneumonitis was but a characteristic or complication of the ARD-like disease and that common etiology was involved.

### Hints Fowl Not Suspect In Histoplasmosis

*Histoplasma capsulatum* and *Microsporium gypseum* were found living freely in soil samples from all parts of Williamson County, Tenn., but different soil sites favored the two fungi.

These findings of a mycological study, made as part of the general epidemiological studies of histoplasmosis in Williamson County, Tenn., were reported by Louis D. Zeidberg, M.D., M.P.H., director, Williamson County tuberculosis study, Tennessee Department of Public Health, and Libero Ajello, Ph.D., in charge of the mycology unit, Communicable Disease Center, Public Health Service.

Tests for the organisms were made



on 493 soil samples obtained from 112 sites on premises where residents had been given histoplasmin sensitivity tests or on sites of a resident who had proved or suspected active histoplasmosis, the investigators reported.

## Isolations

They revealed that *H. capsulatum* was isolated from 28 of the soil samples, and *M. gypseum* was isolated from 27 of 71 of the samples.

*H. capsulatum*, a systemic pathogen, appears to prefer soils upon which chickens have congregated, while *M. gypseum*, a keratinophilic fungus, was found in soils upon which wild and domestic animals are likely to shed keratin, the investigators commented. Twenty-one of the 28 isolations of *H. capsulatum* were from soil samples taken from chickenhouses or chicken yards, they said, while 13 isolates of *M. gypseum* were from under and around dwellings, and 12 were from soils within barns and barnyards.

Knowledge that *M. gypseum* commonly occurs in soil may well alter heretofore accepted concepts of the epidemiology of ringworm infection caused by this agent, the investigators commented.

## Inherent in Soil

Although evidence has been made to acute pulmonary infections resembling histoplasmosis in individuals who had been exposed to high concentrations of pigeon or chicken excreta, they stated, there is only empiric substantiation of this association, an explanation.

Previous studies indicate that *H. capsulatum* will not grow in the normal body temperature of fowl, 42° C., they said. Efforts to infect chickens by peritoneal inoculation with either tuberculate spores or yeast cells of *H. capsulatum* resulted in failure, and cultures of 25 samples of chicken manure collected in Williamson County were negative for *H. capsulatum*, the investigators related.

Thus, they concluded, the evidence is strongly against implicating fowl either as reservoirs or as carriers of

the disease, although they seem in some way implicated with the occurrence of the fungi in nature. Obviously, other factors, perhaps inherent in the soil itself, are important in the occurrence of this fungus in a particular area, they stated.

## Influenza Vaccines Tested In Fort Ord Studies

When influenza is present, the total upper respiratory disease picture can be perceptibly modified by adequate immunization against influenza viruses, stated Edwin H. Lennette, M.D., chief of the viral and rickettsial disease laboratory, California State Department of Public Health, in a report on studies conducted at Fort Ord, Calif., on the value of specific vaccines.

Evidence for this statement was obtained during an outbreak of influenza in the study population in 1952-53, Lennette indicated. He reported that a large proportion of the total upper respiratory disease present was found to be due to influenza A and A' viruses and that the incidence of influenza was about three times higher in the nonimmunized group than it was in the group receiving the specific vaccine.

He considered the finding important since influenzal vaccination has been considered by some as of no value and influenzal vaccination will come into disrepute if the vaccines are expected under all circumstances to show an effect against a syndrome simulating influenza, whether or not the disease concerned actually is influenza.

## Value of Clinical Diagnosis

The symptoms of true influenzal infections are mimicked so perfectly by noninfluenzal infections that clinical diagnosis is generally worthless, Lennette pointed out, yet a diagnosis of influenza is made and the disease reported on clinical grounds. This, he explained, can and does lead to tremendously high morbidity figures for influenza even though the labora-

tory may find only a few cases of influenza based on serologic methods or by isolation of a specific virus.

Lennette warned that immunization against influenza cannot be expected to have any influence on upper respiratory disease other than that due to the specific influenzal viruses. Thus, the efficacy of immunization will depend upon what proportion of the total number of cases of upper respiratory disease is due to the specific influenzal agents, he said, adding that the incidence of upper respiratory disease of noninfluenzal etiology in 1951-52 and 1952-53 was not affected by immunization against influenza.

No assessment of the efficacy of immunization could be made during an outbreak of influenza B in 1951-52, Lennette declared, because the number of cases of this infection was grossly inadequate. The experience during that outbreak illustrates well the need for extended studies conducted over a number of years, and also that definitive results are not necessarily obtainable in spite of the most careful advance planning, he concluded.

## 18 Antigenic Components In Type A Influenza

Eighteen different antigenic components have been measured in type A strains of influenza by a technique developed in the virus laboratory of the University of Michigan School of Public Health.

In announcing the results of studies on strain variations and cross-relationships in influenza virus, Keith E. Jensen, Ph.D., research associate in the university's department of epidemiology, said the quantitative absorption techniques used also showed a wide sharing of antigens among the strains, often in major quantities.

## Foresees Vaccine

This finding, he said, suggests that by a careful selection of strains, all identified components might be ade-

quately represented in a single vaccine. With mineral oil adjuvant vaccines, only small quantities of antigen are needed, and thus several strains of virus can be combined in a single inoculum, he pointed out, adding that this inoculum should stimulate the desired broad immunity against the disease. An antibody for a few antigenic components was used in earlier saline vaccines, Jensen said.

From test findings, Jensen said, it appears that a mixture of Swine, WS, PR8, Gat, Weiss, FMI, and Jes-sup strains would satisfy the need.

"To test this assumption, the pool of 18 serums which contained high levels of antibody to the entire complement of antigens was subjected to simultaneous absorption with 4 absorbing units of each of these strains. The titer against the type B Lee strain was unaltered, but all other antibody was absorbed except for small residues (1:4) against Talmey, BH, and Cam," he said.

"It is apparent," he said, "that such a combination should be efficient in stimulating antibody to all known antigens and probably others which, currently less prominent, may be dominant in strains to be isolated in the future."

Jensen also stated that "the probability of the appearance of completely unrelated antigens, and complete disappearance of old antigens appears small." Moreover, he said, the interrelationships are such as to retain characteristics of type A virus in all the strains.

The quantitative absorption technique was based upon the demonstrations that influenza virus attached to red blood cells absorbs antibody from serum, Jensen explained.

In the experiments, following the techniques developed for insuring stable cell-virus complexes and for determining the antibody-absorptive capacity of each lot of virus-coated cells, 18 strain-specific serums were prepared from 29 different convalescent ferret serums and tested with 42 related strains of virus, Jensen related. Thus, he said, apparently

there are at least 18 different antigenic components in type A influenza virus. Evidence of other components also is available from the unsuccessful attempts to prepare strain-specific serums, he observed.

"The results forecast the extreme complexity of antigenic constitution that may eventually be defined for this group of viruses, and point out the gross oversimplification of the problem that is found in schemes for writing antigenic formulas in terms of 3 or 4 or 8 antigenic components," he stated.

Jensen concluded that "the cross-relationships of strains of influenza virus through common antigens greatly outweigh the importance of antigenic variation. The primary problem for analysis remains that of studying the influence of various strains in inducing and heightening homologous and heterologous antibody by vaccination of man with the view toward obtaining effective levels of antibody against all components of influenza virus and the resultant broad immunity against all variants."

## Development of Programs In School Health

*School health programs from kindergarten on through health courses given teachers were discussed before the American School Health Association and the APHA school health section. More stress on the teacher-parent conference in a school health program would place the horse before the cart, the conferees heard. Georgia's tricounty project of case finding and financial aid, when needed, for correction of physical defects in public school children was explained. Great Neck's health program from kindergarten through high school was reported, and the shortcomings of health education in teachers colleges were analyzed.*

### Great Neck Health Program Begins in Kindergarten

The health program of the public schools of Great Neck, Long Island, as visualized by the superintendent, John D. Miller, Ed. D., is a "good but not perfect" integrated whole, beginning in the kindergarten and going through the high school. It takes care not only of the 7,700 public school pupils, but also of the 750 parochial school pupils, Miller told the American School Health Association.

The health staff consists of 1 chief school physician, 3 part-time physicians, 8 nurse-teachers, 2 dental

hygienists, and 1 part-time dentist, Miller reported. The director of health, physical education, and recreation serves as a systemwide coordinator and the principals coordinate the work within their respective schools. He stated that close cooperation exists between the health service people and those of the psychological and guidance services, and of the reading and speech specialists and visiting teachers. There are 5 school psychologists and a consulting psychiatrist. The safety phase of health education is supplemented by 2 full-time specialists in driver education.

Through the sixth grade, health is an important part of the curriculum,

which under the guidance of the regular teacher is adapted to the interests of children, Miller continued. In the junior high school, health instruction is the responsibility of science teachers. The senior high school, Miller said, offers special health courses on a twice-a-week basis to students in the tenth and eleventh grades.

The nurse-teacher, Miller believes, is one of the important members of the health team. She is a resource specialist. The regular teacher relieves the nurse-teacher of much routine work, the superintendent said, thus freeing her for health counseling and allowing her to exercise the health leadership that steps up the whole program.

### Teachers College Survey Shows Lack of Direction

Many opportunities for effective, functional, and logical integration of health and safety experiences are being overlooked by teachers colleges, reported Marjorie A. C. Young, M.Ed., M.P.H., consultant in education, National Society for the Prevention of Blindness, New York City.

This is due chiefly to the lack of administrative cooperation and planning or the failure to understand the relationship that health and safety education has to undergraduate teacher training, Young said. Administrative responsibility of the college health programs rests mainly with the physicians and nurses, and there was little integration between the service and educational aspects of the programs surveyed, she stated.

#### *Survey Findings*

Young summarized the major findings and recommendations of a health survey of 40 teachers colleges. The survey, a joint undertaking of the American Association of Colleges for Teacher Education and the National Society for the Prevention of Blindness, is a phase of a project

aimed at the development of functional, integrated programs of eye health and safety for prospective teachers, Young said.

"There is no idealized, generalized health education program that will meet the needs of all the survey colleges," she observed. "Each institution must evolve its own master plan, based upon the local college and community resources, needs, and attitudes."

"Any curriculum designed for prospective teachers should have a dual purpose: It should emphasize the knowledges, skills, and attitudes the teachers will need to safeguard their own health, and it should include the professional information and experience which teachers must possess in order to protect the health of their future students," she said.

#### *Health Instruction*

About half the schools have a required basic personal health course; 16 require a course designed to assist prospective teachers to understand their specific functions and responsibilities in the school health program, the education consultant noted. "Those interested in integrating material on any special area of health, such as eye health, accident prevention or tuberculosis control, may have to approach their objectives from other curricular directions."

"Teachers, too, learn by doing," Young continued. "... teacher-training institutions will have to participate with the student-teaching centers and their communities in the development of modern, acceptable school-community health programs. In fact, in many areas, such programs will not be developed unless the teachers colleges assume the initiative."

#### *Other Findings*

"Colleges should be concerned with the promotion of all environmental factors conducive to providing a more healthful life for students," Young indicated. "The college program, with its heavy emphasis on

prolonged reading, makes increased demands upon the student's vision. Therefore, the illumination of all study areas was analyzed in considerable detail. Only a very small percentage of the classrooms, laboratories, shops, gymnasiums, and dormitory rooms met the qualitative and quantitative standards commonly accepted by authorities. Deficiencies were almost universally related to poor utilization and maintenance of existing facilities and to lack of knowledge of the fundamental principles of providing a comfortable visual environment."

"It is revealing to note that 6 of the 40 colleges did not employ physicians on even a part-time basis; 19 colleges had 1 or more part-time physicians; and 15 had 1 or more full-time physicians," Young also reported. About one-fifth of the colleges did no vision screening at all during the 4 undergraduate years; and about one-half screened students once, at entrance. Most of the testing is below standard.

Injury prevention measures, basic student education in nutrition, objective appraisal of off-campus housing, and wider student participation in available recreation opportunities were also cited by Young as additional needs of the health programs.

"There is a definite relationship between the status of the college health and safety programs and the status of any of its components, such as eye health," Young remarked. "Attempts to improve the specific component should be related, whenever possible, to the improvement of the total program."

### Georgia Charts Progress Of Tricounty Project

The Georgia school health project conducted in Lamar, Pike, and Spalding Counties, in the opinion of Guy V. Rice, M.D., director of the health conservation services, Georgia Department of Public Health, and James R. Thomas, M.D., health commissioner of the Lamar-Pike-Spalding



ing Health District, Georgia, has succeeded in developing a local health department program for correcting physical defects in public school children whose parents can pay only in part or not at all.

The health officials reported on the first 3 years of project operation—from 1948–51—its origin, the types of examinations given, the kinds of defects uncovered and corrected, the cost of correction, and some of the difficulties encountered in administration. Information on the first 5 years will be available later, they said.

The total number of defects found in the pediatric examinations over the 3-year period reported by the officials, the average number of defects found for each child, and the indicated method of payment for the defects corrected are shown in the accompanying table. Approximately \$52,615 was spent for correction of defects, they said.

#### *The Special Project*

The tricity health district was selected for demonstration of a school health program, financed by the Children's Bureau of the U. S. Department of Health, Education,

and Welfare, according to Rice and Thomas. A factor in this selection was the good working relationship between the local health and education departments, the adequacy of local community facilities for developing a training center for public health, education, and other personnel interested in a school health program, and Spalding County's experience with a going school health program, gained from an earlier four-county project under a Kellogg Foundation grant.

Also, they said, the district represented three typical Georgia counties: one is largely dependent on industry, another combines agricultural and industrial interests, and the third is predominantly agricultural. The health district met the normally accepted requirements defined by the American Public Health Association for its population of approximately 50,000, they added, and the area contained 28 practicing physicians, 5 dentists, 2 hospitals (10- and 50-bed), and a new 100-bed hospital completed in 1951. The school-age population was approximately 11,000, in 95 schools under 5 school systems, and the racial distribution, they said, was comparable to

the rest of Georgia, as well as to the southeast area of the United States.

The different school systems made for complexity in administering the project, the officials observed, adding that a lag in approval of the funds delayed its start the first year and that too little was done on the project to bring the public health nurse and the classroom teacher into the picture. "Probably the major problem faced has been the rather hurried manner in which the project was begun," Rice and Thomas remarked.

The quality of the care given the children who had defects corrected under the program was excellent, the authors indicated. Much of it was given by general practitioners, they noted, rather than by members of various specialty boards, but these general practitioners did not hesitate to seek consultation in a difficult case or to refer it to specialists in Atlanta, if necessary.

#### **New Models Suggested For School Programs**

The teacher-parent conference is an opportunity which has been generally overlooked in school health programs, G. Robert Koopman told the American School Health Association. Koopman, associate superintendent of the Michigan State Department of Public Instruction, suggested that "Needed—New Models," as a slogan, might well guide action research in the field of school health.

"Where live reporting has replaced the traditional report card, the teacher and family develop many informal and semiformal relationships centered around the child and his growth," he continued. "The appreciation and development of this kind of practice is of prime importance in school health, yet no concerted program for the promotion or extension of this remarkable practice has been developed by school health people."

"If the concept of the teacher-parent operational team should be ac-

**Georgia school health project—number of defects found in pediatric examination, number referable under the program, and type of payment for referable defects, 1948–49 through 1950–51**

Grade	Defects found		Defects referable		Type of payment for referable defects	
	Number	Average per child examined	Number	Average per child examined	Project funds	Other <sup>1</sup>
1st.....	548	0.90	498	0.82	455	43
2d.....	469	1.04	430	.96	401	29
3d.....	423	1.21	384	1.10	359	25
4th.....	370	1.19	341	1.10	322	19
5th.....	242	1.13	222	1.04	210	12
6th.....	232	1.15	208	1.03	191	17
7th.....	173	1.12	150	.97	142	8
Other and unknown.....	19	1.46	19	1.46	17	2
Total.....	2,476	1.08	2,252	.98	2,097	155

<sup>1</sup> Mostly family pay.

cepted as sound, then the role of specialized personnel changes," he added. "The physician . . . would become conscious of myriads of teaching opportunities instead of tongue depressors, examination records, and disease-bearing bugs."

#### *A Community Project*

There is a real, central need for school and community-centered health programs, locally planned, administered, supported, and evaluated, Koopman emphasized. Present programs are based upon a traditional core of attitudes and services which seem to be rather obsolete. "Re-thinking" about school health programs and a different accent are needed.

"The cart has been placed before the horse in most of our school health efforts," he continued. "It is utterly unthinkable that a sparse sprinkling of public health personnel can minister to the health guidance of the entire population. The folly of ignoring the real operators—teachers and parents—may account for our failures in the field of mental health."

"Health is a common denominator of community life," Koopman declared. "It belongs to all planning, to all recreation, to all work. Communities are replete with organized groups. These existing groups must be made conscious of the realities of health. A board of township supervisors that does nothing about health is reflecting the low cultural level of its constituents, not necessarily its own set of values. Public health work is based on the axiom that large health problems cannot be managed by the individual alone."

Koopman listed four "musts" for a school health program: It must be a cooperative community project. It must be designed primarily to assist teachers and parents. The specialized personnel of a school health program must spend full time on leadership and activities designed to educate key personnel. The program must be equipped with well-organized inservice and planning activities.

## Gamma Globulin and Vaccine Tests In Prevention of Poliomyelitis

*A preliminary evaluation of the effectiveness of gamma globulin in preventing or modifying poliomyelitis during 1953 and New York's plan for distribution of the blood derivative to nonhousehold as well as household contacts of poliomyelitis cases were presented before the joint session of the epidemiology and laboratory sections. The conferees also heard how tissue-culture methods are being used in the study of poliomyelitis, and a group of researchers announced that an ultraviolet-irradiated trivalent vaccine has been successfully tested on human volunteers.*

#### **Age Shifts a Major Problem In Preliminary Evaluation**

Shifts in the age distribution of poliomyelitis cases during the course of the 1953 epidemics present the most difficult problems in evaluating the effects of gamma globulin, said Abraham M. Lilienfeld, M.D., M.P.H., and Alexander D. Langmuir, M.D., M.P.H., in reporting the preliminary findings of the Public Health Service national gamma globulin evaluation program.

Broad conclusions from these early findings are neither warranted nor appropriate at present, they warned, adding that a comprehensive report will be released early in 1954.

Dr. Lilienfeld is assistant professor of epidemiology, Johns Hopkins University School of Hygiene and Public Health, as well as director of the evaluation program. Dr. Langmuir is chief of the Epidemiology Branch of the Public Health Service's Communicable Disease Center.

When the extent of the national expenditure in distributing and administering gamma globulin was realized, the Public Health Service in collaboration with the Association of State and Territorial Health Officers undertook to collect epidemiological and evaluation data concerning the effects of gamma globulin in preventing and modifying poliomye-

litis during 1953, the authors stated. An advisory committee composed of State and local epidemiologists and poliomyelitis authorities, the American Physical Therapy Association, the D. T. Watson School of Physiatrics (an affiliate of the University of Pittsburgh School of Medicine), and the National Foundation for Infantile Paralysis have also actively collaborated in planning the evaluation. The Public Health Service has a staff of epidemic intelligence service officers, nurse-epidemiologists, and statisticians working on the study, they added.

#### *Program Objectives*

Because of the preliminary nature of the progress report, the authors stated they would confine their current discussion to the evaluation of gamma globulin in contact prophylaxis and evaluation of gamma globulin in mass or community prophylaxis, 2 of the 4 study objectives recommended by the advisory committee. The other 2, they said, are the collection of data bearing on the administrative aspects of the distribution of gamma globulin and the collection of information bearing on the general epidemiology of poliomyelitis. In planning the program, they reported, the possibilities of evaluating both the preventive and modifying effects of gamma globulin were considered.

Since it was not possible in 1953 to collect the definitive data necessary to study the preventive effect of gamma globulin, the authors explained, recourse was taken to securing detailed epidemiological descriptions of the epidemics occurring in each of the areas where mass prophylaxis was employed. By comparing the course and character of such epidemics with previous epidemics in the same or similar populations, consistently different epidemiological patterns might be uncovered that would indicate the effect of gamma globulin, they said.

For measuring the modifying effect of the immune serum globulin, the committee had recommended comparing the severity of paralysis among subsequent cases in multiple-case households according to whether or not gamma globulin had been given before the onset of poliomyelitis, the authors reported. The index cases in these households, they explained, would not have received gamma globulin, but a substantial number of subsequent cases would have received it under the national contact prophylaxis program. An essential feature of the evaluation study, they said, is the provision of physical therapy services to all participants—41 States and 3 large cities—and 50-70-day muscle evaluations of the therapy, utilizing a standardized abridged system of muscle-grading.

### *Early Findings*

Data on the modifying effect of gamma globulin were not available for advance reporting because the peak incidence of poliomyelitis occurred early in September and the 50-70-day muscle evaluations could only be completed later, Lilienfeld and Langmuir explained.

In seeking a basis for predicting the subsequent course of epidemics, a study can be made of the shape and character of the epidemic curve following the mass prophylaxis program, they said. "Poliomyelitis epidemics tend toward a symmetrical 'normal-type' curve," they commented. If the poliomyelitis epi-

demic abruptly terminated after the mass use of the immune serum globulin, thus resulting in a clear asymmetry of the epidemic curve, such finding might be interpreted as being due to the beneficial effect of gamma globulin, they indicated.

The authors reported extreme variations between present and past experience with epidemics in the same or comparable areas and remarked: "No consistent patterns have yet been discernible."

The advisory committee had recognized, they noted, that the administration of gamma globulin to a restricted age group, such as children under 10, could hardly be expected to terminate an epidemic. Instead, it was anticipated, they added, that cases would continue to occur but would be relatively concentrated in the older unimmunized age groups. This phenomenon has been consistent in almost all mass prophylaxis areas, they said, and was first thought to be substantial evidence of the effectiveness of the blood derivative, but more thorough analysis raises serious question as to the validity of that conclusion.

In studying 40 poliomyelitis epidemics occurring in previous years, the authors remarked, a trend toward an older age distribution of cases as the epidemics progress was observed in more than half the instances. In some, the age shift was as marked as any observed in the mass prophylaxis areas, they said. Those findings imply, they noted, that epidemics may frequently develop, reach a peak and decline more rapidly in young children than in older age groups. Whether this shift in the age distribution is a common characteristic of all types of poliomyelitis epidemics or whether it occurs only under specified circumstances needs further study, they added.

"If an age shift were to occur only after mass prophylaxis was administered, it may still be possible to use this finding to evaluate gamma globulin," the authors said. "Certainly, however, if the age shift clearly pre-

cedes the mass immunization, it cannot be ascribed to a beneficial effect of the procedure."

### **Tissue-Culture Methods Identify Polio Viruses**

"Tissue-culture methods have revolutionized the study of poliomyelitis," in the opinion of Joseph L. Melnick, Ph.D., associate professor of microbiology, Yale University School of Medicine.

Relatively rapid and quantitative methods are now available for the estimation of poliomyelitis virus or its antibody. The growth of virus in test tubes has led to progress in the development of formalin-inactivated as well as attenuated live vaccines. The new tools are suited also for epidemiological investigations, he believes.

### *Epidemiological Findings*

New serologic methods permit direct measurement of the ratio of inapparent infections to clinical poliomyelitis, the speaker said. In a Winston-Salem, N. C., study, 6 to 16 frank cases were found per 1,000 subclinical cases, the lowest incidence in infants; the highest, in children aged 5 to 9 years.

Melnick reported that antibody patterns for all 3 types of virus during an epidemic of poliomyelitis indicated a low incidence of past infection in children through 4 years of age, and a markedly higher incidence in those over 4. The occurrence of antibodies to multiple types was also "strikingly different" in the two age groups, he said.

Epidemics of poliomyelitis are "not necessarily" caused by a single type of virus; two or more types have been recovered from persons in the same community during an epidemic, Melnick stated. Even during summers of low poliomyelitis incidence, all three antigenic types of virus may be producing disease in a community, and severe forms of the disease may be found even when the total number of cases is low. There



## VACCINE TESTS

was no correlation of strains of one type of virus with a particular form of poliomyelitis, he stated.

### *Other Pathogenic Agents*

Tissue-culture methods to isolate viruses from the stools of poliomyelitis patients have recovered other pathogenic agents, Melnick said, among them, a cytopathogenic strain of Coxsackie virus, an unidentified virus from patients with "non-paralytic poliomyelitis," and cytopathogenic agents from patients diagnosed as having "poliomyelitis."

Apparently, a field is opening up in which hitherto unrecognized human viruses may now be detected by means of tissue-culture methods, the speaker concluded.

### **Report Encouraging Test Of Irradiated Vaccine**

Human volunteers have been vaccinated against poliomyelitis with an ultraviolet-irradiated trivalent vaccine, according to three Chicago investigators, and a consistent and significant rise in antibody titer was noted.

These findings were demonstrated in the immunogenicity studies reported by Albert Milzer, M.D., Ph.D., director of microbiology, Michael Reese Hospital; Sidney O. Levinson, M.D., director, Michael Reese Research Foundation; and Howard J. Shaughnessy, Ph.D., director, division of laboratories, Illinois State Health Department.

### *Preparing the Vaccines*

By means of ultraviolet irradiation it is possible to completely inactivate all three types of poliomyelitis virus grown in tissue culture, the Chicago researchers reported. Inactivation was proved by means of critical safety tests which included both repeated monkey and tissue-culture inoculation, they said.

The vaccines were prepared, they continued, from virus strains representing the three types of poliomyelitis—Mahoney strain for type 1,

MEF-1 for type 2, and Saukett for type 3. The final vaccine contained 19.6 milligrams of protein nitrogen per 100 cubic centimeters and was preserved with 1:10,000 merthiolate.

Each strain was grown individually, titrated, and its identity checked with type-specific antiserum from several laboratories, the investigators reported. All virus titrations and serum neutralization tests were made in roller tube cultures of monkey kidney. The first four supernatants were pooled, and each virus type pool was separately inactivated by ultraviolet irradiation, they said. Each pool of virus was routinely tested for sterility in a variety of culture media and centrifuged in order to remove tissue particles and other debris.

Irradiation, Milzer and his associates said, was carried out in 2 centrifugal filmers connected in series with a film thickness of 25 microns at a flow rate of 200 cc. per minute. Exposure was for 2 seconds. Upon measurement, the ultraviolet energy concentrated in 2,537 angstrom units was found to be absorbed by the film to the extent of  $4 \times 10^{-8}$  Einstein per cubic centimeter.

### *Human Vaccination Studies*

"Human vaccination studies should be carried out only when the incidence of poliomyelitis is minimal. Before undertaking a field study to evaluate a poliomyelitis vaccine, we feel that it would be advisable to proceed cautiously in order to be certain that there are no ill effects and that no risks are taken, for we must avoid the tragic consequences that have accompanied poliomyelitis vaccine research in the past," they said.

Purified mineral oil adjuvant was mixed, according to Salk's technique, with equal parts of the trivalent tissue culture fluid, and 30 normal adult volunteers with no previous history of paralytic poliomyelitis were injected intramuscularly with 1 cc. amounts of the mixture, they said. Each cubic centimeter of the vaccine contained 0.17 cc. of each of the 3 virus types.

Also, 1 month later, a second injection

of 1 cc. of aqueous vaccine consisting of equal parts of the 3 virus types was given intramuscularly to the 30 subjects, the authors continued. Blood specimens were collected before vaccination and 2 weeks after the second vaccination, and each serum was refrigerated until tested, they said. Prevacination and post-vaccination serum samples were routinely tested simultaneously. In addition, a limited number of adult subjects were vaccinated with aqueous irradiated trivalent tissue culture vaccine. Altogether, they related, 52 persons were inoculated with the mineral oil adjuvant or aqueous vaccines.

Prior to vaccination, approximately 63 percent of the 30 subjects possessed antibodies to the 3 virus types: 27 percent had antibodies for 2 types (chiefly types 2 and 3); 10 percent had antibodies for 1 type. On a special study with 4 subjects who received aqueous vaccine, 2 had antibodies to the 3 virus types before vaccination, 1 had antibody response to 2 virus types, and 1 had antibody to 1 type only.

### *The Results*

The apparently totally inactivated vaccine, the investigators said, produced a consistent and significant rise in antibody titer to the 3 types of poliomyelitis virus in most of the 30 vaccinated subjects. The lowest antibody response occurred to the type 1 component of the ultraviolet-irradiated vaccine. Sixty-three percent, they related, developed a four-fold or greater rise in antibody titer for type 1 as compared to 83 percent for type 2 component and 90 percent for type 3. Three persons with no detectable antibody response in their undiluted prevaccination serums developed demonstrable type-specific antibodies to type 1 component in their postvaccination serums, the authors reported.

No significant local or general reactions were encountered in all 52 subjects, vaccinated with either the adjuvant or aqueous vaccines, they said. The presence of antimonkey kidney precipitins could not be de-

tected in the serums of several subjects who developed the highest post-vaccination antibody titers for the 3 virus types.

"Although the number of individuals who received the aqueous vaccine only is small, the fact that there is some indication that the response is comparable to the adjuvant vaccine is encouraging," they concluded.

## Reports on New York Use Of Gamma Globulin

New York State's experience in distributing gamma globulin for the prevention of poliomyelitis might be useful in revising future distribution plans, suggested Robert F. Korns, M.D., director of the bureau of epidemiology and communicable disease control, New York State Department of Health.

Korns outlined the State's 1953 distribution plan, which differed little, he said, from the recommendations issued by the Office of Defense Mobilization or from the plans developed by many other States. "Distribution was limited strictly to the outlined program," Korns said.

The New York plan was unique, however, in that gamma globulin was distributed to limited nonhousehold contacts including nurses caring for poliomyelitis patients, he explained.

However, not all local health officers found it possible to include nonhousehold contacts in their allocations because of the limited supply of the blood derivative, he said.

### 1953 Experience

Most of the problems met were related to the lack of complete knowledge as to what would be the ultimate supply of gamma globulin, Korns said. One obvious change needed, he indicated, is a statement in advance as to how much gamma globulin will be available for each State, so that distribution plans can be geared accordingly.

New York State was initially allocated 158,830 milliliters of gamma globulin and during mid-August 1953 received an additional 8,870 milliliters, Korns reported. The unexpected doubling of the supply late in the season presented the State health department with the difficulty of discovering ways of using the gamma globulin to best advantage, without the risk of wasting it or undermining the existing distribution program, he said.

For the application of mass gamma globulin prophylaxis, more accurate incidence prediction techniques are needed, Korns stated. "The heated arguments as to whether the limited supply of gamma globulin should be utilized for mass community prophylaxis or for household and other

intimate contacts still continues, although the bulk of evidence points to the latter technique as preferable, except in areas where the poliomyelitis attack rate is extremely high," he said.

Among findings reported by Korns were:

The proportion of reported cases of poliomyelitis labeled as paralytic, approximately 60 percent, did not differ from New York experience of the past few years.

An average of 27 milliliters of gamma globulin was given to household contacts and 19 milliliters to nonhousehold contacts, or 46 milliliters per case (see table). On the average, the contacts of paralytic poliomyelitis patients were allocated 10 percent more gamma globulin than the contacts of nonparalytic patients.

Forty-six of the contacts were immunized within the first 3 days after onset of the index case and 77 percent within the first 5 days. Non-household contacts were immunized, on the average, 2 days later than household contacts.

### 1954 Questions

To define clearly what the New York State distribution program will be for 1954, Korns said, depends on how much poliomyelitis will occur; how much gamma globulin will be available, and, among other considerations, the conditions attached to

1953 distribution of gamma globulin in New York State <sup>1</sup> for contacts of poliomyelitis patients

Month of allocation	Cases with onset <sup>2</sup>	Patients requesting gamma globulin	Household contacts		Nonhousehold contacts		All contacts		
			Number	Milli-liters allocated	Number	Milli-liters allocated	Number	Milli-liters allocated	Average per case
June.....	94	53	132	1,502	83	824	215	2,326	44
July.....	362	243	645	7,114	380	4,195	1,025	11,309	42
August.....	621	478	1,193	12,792	812	8,485	2,005	21,277	45
September.....	578	424	929	10,410	845	7,588	1,774	17,998	42
October <sup>2</sup> .....	241	147	350	3,893	456	3,749	806	7,642	52
Total.....	1,896	1,345	3,249	35,711	2,576	24,841	5,825	60,552	46

<sup>1</sup> New York State exclusive of New York City.

<sup>2</sup> Reports received from June 1 up to Oct. 29, 1953.

its use—whether for mass prophylaxis or for household and intimate nonhousehold contacts—whether mass prophylaxis will be limited to consideration of entire counties or of smaller communities as well.

Information is also needed, Korn added, about the risk of acquiring poliomyelitis in certain segments of

the population. Facts are needed, he said, about the poliomyelitis secondary attack rate, by age groups, in classrooms, camp populations, and similar groups exposed to the disease. More definitive information is also needed as to the excess risk nurses and physicians run of acquiring poliomyelitis.

ance is present to 1 or 5 micrograms of isoniazid "it is probable that the culture count will remain 1 plus and in most instances 2 to 4 plus," the investigators stated.

With reports such as this on culture count and drug sensitivity the bacteriological progress of the unhospitalized patient can be determined while he is under treatment, Widelock and Robins concluded. Results of the tests can be plotted to show his progress and to indicate probable virulence of tubercle bacilli resistant to isoniazid.

## Three Research Developments In Tuberculosis Control

*Reports on ambulatory treatment programs with tuberculosis patients in Pittsburgh and New York City and on studies made at Philadelphia's Henry Phipps Institute on reactions to tuberculin tests were among the topics of discussion at the joint session of the epidemiology and laboratory sections.*

### Sputum Culture Technique Adopted by New York

The New York City Department of Health has adopted a new laboratory program of culturing sputums of all its unhospitalized tuberculosis patients in order to evaluate their progress while under treatment, and of routine testing of tubercle bacilli for sensitivity to the drugs employed. Daniel Widelock, Ph.D., and Arthur B. Robins, M.D., Dr.P.H., assistant director and director, respectively, of the department's bureau of laboratories and bureau of tuberculosis, so reported to the epidemiology and laboratory sections of the APHA.

Under a health department program begun in July 1953 for the antibacterial treatment of unhospitalized patients with tuberculosis, both the clinics and the laboratory consider all such patients as candidates for treatment, they reported, and the health department laboratory now offers service "equivalent to that of a good tuberculosis hospital laboratory."

The smear technique is no longer part of the laboratory routine, they continued. All sputums of unhospitalized patients participating in the programs are cultured. Reports are made on the basis of colony counts, reported as 4 plus for "confluent growth, no particulate colonies," down to "less than 1 plus," for "under 50 colonies; number of colonies reported as found."

### Drug Sensitivity

Sputums are tested routinely for sensitivity to 1.0 microgram of isoniazid and to "the usual" 100 micrograms of streptomycin. Drug sensitivity is determined by direct inoculation of sputum concentrates on drug-free as well as drug-containing culture media. The laboratory has found that an increase in drug resistance and in culture count usually follows the appearance of colonies of organisms on media containing "as little as 0.1 microgram of isoniazid per milliliter." Resistance to this amount of the drug "is to be considered a warning that greater resistance may soon develop, and if resist-

### Phipps Institute Tests Tuberculin Potencies

Striking differences in the potency of various samples of old tuberculin and different purified tuberculins, brought out by comparative tuberculin tests on BCG vaccinated persons, were reported by three research workers from the Henry Phipps Institute, University of Pennsylvania. Unvaccinated persons with a high level of tuberculin hypersensitivity are less favorable subjects for determining tuberculin potency than groups with a low level of sensitivity such as results from BCG vaccination, according to the investigators, Joseph D. Aronson, M.D., professor of bacteriology; Helen C. Taylor, R.N., and Marie T. McGettigan, R.N., research nurses.

Both the percentage of people who react to tuberculin and the intensity of local reactions have decreased in recent years with the reduction in tuberculosis morbidity and mortality, Aronson and his associates stated. "In view of these changes, it is essential to use tuberculin of high potency, to detect those with a low level of hypersensitivity," they claimed. The tuberculin reaction, in addition to its use as a testing measure, has also become the index of a successful vaccination since the introduction of BCG vaccine, they continued. Furthermore, the percentage of vaccinated persons who develop a postvaccinal tuberculin re-



action can be used to evaluate the immunogenic property of different samples of BCG vaccine, they added.

"Old tuberculin continues to be prepared with but slight modification in the same manner as originally prescribed by Koch in 1891. The procedures used by different investigators to obtain purified tuberculin vary in some detail," the group explained.

The researchers compared the reactive values of old tuberculin (OT) and several purified tuberculins: PPD (purified protein derivative prepared by Seibert with trichloroacetic acid), RT and PT ("renset tuberculin" and "purified tuberculin," respectively, both prepared at the State Serum Institute, Copenhagen), "Weybridge PPD" (prepared in Weybridge, England), and PPD-S (purified protein derivative-standard prepared by Seibert and Glenn with ammonium sulfate).

### Test Results

Among unvaccinated persons with a high level of tuberculin hypersensitivity, the incidence of positive tuberculin reactions was approximately the same to 0.01 mg. of OT, to 0.00002 mg. of PPD, to the same amounts of Weybridge PPD and PPD-S, and to 1 unit of RT or PT, the University of Pennsylvania group reported. Tablets of PPD-S gave a lower incidence of positive reactions among unvaccinated persons than did the liquid PPD-S, according to the investigators.

Among persons vaccinated with BCG vaccine 2 to 5 months before being tested, the incidence of positive tuberculin reactions was approximately the same with 0.1 mg. of OT, with 0.0002 mg. of Weybridge PPD, and with 10 units of RT or PT, the group said and added that the reaction was considerably lower with 0.0001 mg. PPD-S. Tablets of PPD-S manufactured by 2 companies gave 47 percent and 58 percent fewer reactions, respectively, than did OT when the PPD-S tablets and OT were given vaccinated individuals, it was reported.

Approximately the same percent-

age of BCG vaccinated persons reacted to 0.0002 mg., Avian PPD (Weybridge, England) as to 0.1 mg. OT while 25 percent fewer persons reacted to 0.0001 mg. balnei PPD (Weybridge, England) than to 0.1 mg. OT. Aronson and his colleagues said.

In their opinion, the "patch test" with OT is less sensitive in both unvaccinated and vaccinated adults than the intracutaneous tuberculin test with OT or PPD-S.

### Home Care in Pittsburgh Reduces Hospital Stay

An estimated reduction of approximately 50 percent in the period of hospitalization for pulmonary tuberculosis was achieved recently by cautiously discharging selected patients from the City Tuberculosis Hospital in Pittsburgh and continuing directed treatment with isoniazid at their homes, according to a study reported by four members of the Pittsburgh Department of Public Health.

Authors of the paper are Merle Bundy, M.D., M.P.H., chief, tuberculosis control division of the Pitts-

burgh Department of Public Health; George E. Martin, M.D., medical director of the Pittsburgh City Tuberculosis Hospital; I. Hope Alexander, M.D., director, and Carl C. Kuehn, M.D., M.P.H., deputy director of the Department of Public Health.

A favorable outlook for recovery from pulmonary tuberculosis, as indicated by sputum tests and X-ray reports, governed selection of the patients, they stated. Home conditions and the patient's psychological attitude were also factors in the choice of patients, the physicians reported.

### Isoniazid at Home

The experiment of home treatment was undertaken, the group said, when a metropolitan area X-ray survey indicated that an "avalanche of new cases" was expected for the Pittsburgh City Hospital, which already had a waiting list varying from 75 to 90. The average length of hospital stay had gradually increased by 1952 to almost 13 months, they reported, and isoniazid was the only active treatment given to many patients.

The decision to continue isoniazid treatment in the patients' home resulted in producing a surplus of from

**Length of hospitalization by stage of pulmonary tuberculosis on admission for 2 groups of 172 early discharges**

Length of stay in months	Group receiving isoniazid				Group receiving streptomycin			
	Total	Minimal	Moderately advanced	Far advanced	Total	Minimal	Moderately advanced	Far advanced
Less than 3--	6	2	1	3	4	1	2	1
3-5-----	17		8	9	5	1	4	
6-8-----	15	1	4	10	22	2	6	14
9-11-----	20	1	4	15	10		1	9
12-14-----	13		1	12	10		3	7
15-17-----	10		1	9	2			2
18-20-----	5		1	4				
21-23-----	7			7	3			3
24-29-----	8			8	4		1	3
30-35-----	2		1	1	1			1
36 and over..	8		2	6				
<b>Total..</b>	<b>111</b>	<b>4</b>	<b>23</b>	<b>84</b>	<b>61</b>	<b>4</b>	<b>17</b>	<b>40</b>

40 to 50 beds, the physicians said. They said that during a 10-month period ending March 31, 1953, 55 percent of the live discharges left the hospital much sooner than would ordinarily have been expected. In addition to the patients who were discharged for home treatment with isoniazid, this percentage includes an additional group of patients who received streptomycin and para-aminosalicylic acid (PAS) after leaving the city hospital, the Pittsburgh physicians said.

The isoniazid-treated patients had already received, on the average, more than 50 gm. of streptomycin and were considered "streptomycin failures," said Bundy and his co-workers. Despite this fact, the physicians continued, 36 percent of the group were discharged within 8 months after admission. Many of these patients were in a far advanced stage of pulmonary tuberculosis at the time of admission and had been in the hospital 1 or more years, even before isoniazid was available, they said in discussing a series of tables.

In reference to the accompanying table, Bundy and his associates said the high percentage within 8 months was encouraging. Fifty percent of the group receiving streptomycin were discharged from the hospital within that period of time, they continued. "This indicates that when the patients respond to chemotherapy a favorable response of 50 percent of the cases may be expected in 6 to 8 months, or sooner," said the physicians.

## Low Failure Rate

One hundred and eleven patients, or 35 percent of the live discharges from June 1, 1952, to March 31, 1953, were continued on isoniazid after discharge from the hospital, said Bundy and his coworkers. "There were 3 failures, or less than 3 percent reported in this period, with 2 of the patients successfully re-treated and the third yet to be tried on re-admission. Sixty-one patients, or 20 percent of the live discharges during the period, had been treated or were

continued on streptomycin and PAS. There were 4 failures, or 7 percent in this group. . . . These failure rates contrast markedly with the average of a 32 percent readmission rate to the hospital in any 1 year," they continued.

The public health physicians stressed the importance of continued medical observation of the discharged patients who, after 17 months, are still maintained on

isoniazid or streptomycin and PAS.

The transfer from the hospital to that of the home atmosphere contributes as much to the patient's recovery as close hospital supervision, the physicians believe. It is planned to continue the procedure, they said. If the need for hospital beds should again become great, a similar project for patients who had never been hospitalized will be instituted, they reported.

## School Health Services— Administrative Facets

*The administration of Mississippi's School Health Service and the training of physicians for school health service in New York City were described by State health officials at sessions of the APHA school health section. Members of the American School Health Association at general and section meetings heard reports on the status of school physicians throughout the United States and on the status of school nurses in Chicago. They also heard talks on what advisory school health councils are accomplishing in Pennsylvania, New Jersey, and Ohio, and on how public relations is being effectively integrated in school health education programs.*

## Mississippi School Health— Adventure in Cooperation

The 11-year-old school health service in Mississippi was characterized as representative of the programs in many States by Felix J. Underwood, M.D., executive officer of the Mississippi State Board of Health, in outlining the progress of coordinated school health work in his as well as the other States.

In 1942, both the Mississippi State Board of Health and the State Department of Education undertook a joint program of school health service for school-age children. Five years later, Underwood reported, the

two departments reached agreement as to division and sharing of work, administrative responsibility, and policy formulation.

## Joint Agreements

Protection of children and of teachers and other school employees from communicable diseases, provision of frequent dental examinations, and detection of actual disease or physical defects that may impede normal growth and development are 3 of 9 objectives outlined at the program's start.

Two of the joint duties agreed to in 1947 include:

Joint planning and administration of the school health program in each

county by the county health officer and the county and local school administrators under the guidance and direction of the school health service.

Equal responsibility for the local school health program by the county health officer and the local school administrator, but major responsibility by the health officer in the field of health services, and major responsibility by the school administrator in the field of health training.

The small, effective administrative staff of the Mississippi School Health Service consists of a medical director who is well trained in public health work, a codirector who is well trained in educational work, a supervisor of teacher training in

health, a supervisor of physical education and recreation, and two secretaries.

### *Child Care Groups*

The effectiveness of the program comes from those who are cooperating—a large group of people responsible for important health, education, and welfare services. Among this group are the health officer and the school superintendent, the public health nurse, the classroom teacher, the health educator, and the sanitation supervisor.

The coordinating activities of the school health service have been extended to all of the official and voluntary child-caring agencies in Mis-

issippi, such as the division for the blind and the division of child welfare in the Mississippi State Department of Public Welfare and the Mississippi Crippled Children's Service.

### *Other Programs*

Unified school health programs, jointly operated by State health and education authorities, are also operating in Alabama, North Carolina, Oklahoma, Pennsylvania, and the Territory of Hawaii, Underwood reported. Four States did not report a plan for coordinating school health activities. In most of the other States, coordination of school health work is usually the responsibility of some type of joint staff committee.

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Dr. Underwood also mentioned that booklets and descriptive literature on school health services have been published by the National Council of Chief State School Officers, Washington, D. C., and by health or education departments of several States. The Mississippi School Health Service and the Mississippi Department of Education, Jackson, have issued *A Proposed School Health Program*, a 40-page booklet describing the Mississippi School Health Service. Others he cited are listed here:

*Survey of School Health Services in the City of New Orleans*, published by Louisiana State Department of Health, Section on Maternal and Child Health, New Orleans.

*South Carolina Manual for the Use of the School Health Record*, published by South Carolina State Department of Education, South Carolina State Board of Health, Columbia, S. C.

*The Washington County, Maryland, School Health Demonstration Program, Plan for School Health Services, Hagerstown, Md., and Public Health Nursing Services as Part of a Total Health Program in the Schools of Maryland*, published by Maryland State Department of Health, and the Maryland State Department of Education, Baltimore, Md.

*Coordination of School and Community Health Service*, published by Office of Public Health Education, New York State Department of Health, Albany, N. Y.

*Health Services for the School-Age Child in Oregon*, published by the State Department of Education, Salem, Oreg., and the State Board of Health, Portland, Oreg.

*School Health Manual*, prepared by a Joint Committee of the Minnesota Department of Health and State Department of Education, Minneapolis, Minn.

*Guide for the School Health Service Program*, published by State Superintendent of Public Instruction, and State Department of Health, Seattle, Wash.

*A Proposed School Health Program*, issued by Mississippi School Health Service and Mississippi Department of Education, Jackson, Miss.

*Responsibilities of State Departments of Education and Health for School Health Services*, sponsored jointly by the National Council of Chief State School Officers and the Association of State and Territorial Health Officers; order from National Council of Chief State School Officers, 1201 Sixteenth Street NW., Washington 6, D. C.

## **Advisory Health Councils Need More Guidance**

Advisory health councils, whether mandatory or voluntary, belong in any complete school health program, but they badly need inspired guidance from such professional organizations as the American Public Health Association, Carl C. Fischer, M.D., professor and head of the division of pediatrics, Hahnemann Medical College and Hospital, Philadelphia, told the American School Health Association.

Fischer, who is also chairman of the Pennsylvania Medical Society's Commission on School and Child Health, described the progress achieved in promoting advisory school health councils in Pennsylvania, where they are mandatory, and in New Jersey and Ohio, where they are not.

The pediatrician compared the functions of an advisory health council to those of a board of trustees for a university, hospital, or public welfare agency.

If advisory health councils are to effectively promote the school health program and particularly its health education aspects, they must represent all interested groups and not simply the professional groups specif-



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ically involved in the school medical and dental examinations, Fischer stressed.

### *The Pennsylvania Law*

Fischer said that in Pennsylvania the subcommittee on health of the Governor's Committee on Children and Youth, appointed to follow up the recommendations of the Midcentury White House Conference, looked into the advisability of advisory health councils to the school system.

A Pennsylvania act, passed in 1947, he said, directs district superintendents in school districts of the first, second, and third classes and county superintendents to set up advisory health councils to study the health needs and to assist in organizing a followup program.

The law further specifies, he said, that those making the medical and dental examinations make an annual report to the advisory council, and later report on the remedial work accomplished during the school year. The law also decrees, he added, that the advisory councils be composed of representatives of medical and dental associations, social organizations, veterans' organizations, parent-teacher associations, service clubs, and other organizations in the council's area.

### *Pennsylvania Councils*

Of the 275 councils created in Pennsylvania since 1947, 85 have reported organization completed; 19, in process; 9, the use of another kind of group; and 58, that they have no council, Fischer said. Questionnaires were sent to all district school superintendents responsible for creating the health councils, he said, but replies were received from only 172.

In a followup inquiry to which 65 councils replied, 61 reported that they were studying the health needs of the home, school, and community, he continued.

These needs were listed by the responding councils in order of importance: First place was given to a better dental health program including clinics, followup procedures, and dental education for parents; second

place to health education programs for the school, community, and especially parents (in respect to the correction of defects); and third place to intensive followup with greater financial and treatment resources for the correction of defects. Such other needs as correction of visual defects, better school lunch programs, better recreation facilities, improved immunization programs, and better mental health facilities were also listed, Fischer noted.

When the councils were asked if they had established objectives according to these health needs, 45 replied in the affirmative, he continued. Specifically, 17 listed correction of defects; 5, dental corrections; 5, the increase of equipment or establishment of clinic facilities; 4, the stimulation of community interest; 3, the assistance of indigent or lax parents; and 3, obtaining better cooperation from parents and teachers.

### *New Jersey and Ohio*

Fischer reported that in New Jersey advisory health councils are voluntary and are made up of personnel from all areas of community health; also, that a State health council, set up in 1949 as an advisory group to the State medical society, has worked for the formation of councils in each county.

Fischer reported that objectives of the New Jersey councils were the promotion of recommendations for a stripped-to-the-waist examination, a complete school medical examination once every 4 years, the appointment of a school psychiatrist to assist in school mental health, and an annual tuberculosis examination of teachers and all board of education members.

The Ohio State Department of Health, Fischer said, reported that the school health councils are voluntary and are set up on school district, county, or individual school levels. Estimates, Fischer said, are that not more than 25 percent of the units have developed active councils and that major interests are school health services, first aid and home

nursing, and school and home accident prevention and emergency programs.

### **Public Relations Has Role In Health Education**

Public relations is an integral part of a school health program, Abram Cohen, D.D.S., supervisor of dental services, Philadelphia Board of Public Education, told the American School Health Association. Dr. Cohen is also associate in oral medicine, University of Pennsylvania School of Dentistry.

The most important phase of health in education is education in health, he stressed. The home, school, and community leaders must join in solving the problem of the health of the pupil, he said, adding that such joint action has often been initiated by the school system. "I feel the school health personnel must consider it as one of its daily functions to practice and strive for constant improvement of public relations," he said.

The teacher, then the school nurse, the dental hygienist, the school physician, the school dentist, the health coordinator, if available, and the principal are the primary leaders in the development of a good school public relations program, according to Cohen.

### *Hub of the Program*

The school nurse is the hub of the school health program, he said. "Her contribution to the program can be the greatest of all, if her temperament is tranquil and her interest and enthusiasm remain at a high level. She can assist in coordinating the nursing service with other phases of the health program. As the liaison between the school and home, the teacher and school physician, the school and community centers, she is able to obtain maximum correction of defects. If tact and diplomacy are exercised in her public relations efforts, she can bring about excellent results."

The threefold responsibility of the school in the field of health, Cohen told the association, are promotion of good health by education; protection of the pupils from disease and ill health by adequate sanitation, immunization, and provision of teachers who are physically well and emotionally stable; and stimulation of interest in the correction of remedial defects. Adequate health personnel is essential to protect the school child from exposure to infectious diseases, he said.

#### *Successful Motivation*

An "encouraging result in health education" was seen in a dental service survey sponsored by the Health and Welfare Council of Philadelphia in conjunction with the board of public education, Cohen said. The project was planned to determine whether children from families of low socioeconomic levels, who were previously treated for dental defects by a voluntary health agency, could be educated to seek the services of the private practitioner for subsequent treatment when needed, he said. The survey, which questioned 192 parents of 160 first-grade children, revealed that:

65 parents of first-graders knew the name of a neighborhood dentist.

56 were not aware, or did not know the name, of a private dentist.

68 signified their intention of going to a private dentist to investigate the cost.

51 stated their financial inability to seek treatment from a private practitioner.

Six months later, Cohen reported, a statistical check showed that 20 percent of the parents of the children in the project were stimulated to seek the services of a private dentist and not to remain on a clinic roster.

### **School Physician Training Provided in New York**

A practical training program designed to give the school physician a basic understanding of the principles of school health service has

been in operation in New York City during the past 5 years, three health officials reported.

Describing the program were Robert W. Culbert, M.D., M.P.H., director, bureau of school health, and Harold Jacobziner, M.D., M.P.H., assistant commissioner, maternal and child health services, both of the New York City Department of Health, and Philip Ollstein, M.D., assistant professor of public health and preventive medicine, Cornell University Medical College.

There is a growing tendency to regard the finding and following of the child with a health problem as the primary objective of school health service, with a decreasing emphasis on routine examination, the physicians said.

They emphasized that a successful school health program must have physicians well trained in school health practice; public health nurses with special orientation in school health services; and teachers trained to observe the health of their students.

#### *Special Techniques*

Warranting the extra time spent in training the school physician, they said, are the following requirements:

First, the examination is health-centered rather than disease-centered. Instead of seeking the cause for a complaint, the school doctor must discover and evaluate deviations or potential deviations from the normal. Therefore, the kind of things looked for, the history taking, and above all the advice given a parent, will have many implications as to the future health care of the child, particularly as his emotional and physical development affects school attendance.

Second, the school physician must be familiar with screening techniques, such as vision and hearing, and be able to evaluate the results for the educational staff.

Third, he must be familiar enough with the school environment, physical plant, and sanitary equipment to be able to judge their effects on

school children, and he must also be thoroughly familiar with the many kinds of physical education programs the child encounters.

#### *Training Program*

The training program in New York City includes two courses a year, the doctors reported, with the faculty drawn from the department of health, board of education, and medical schools in the city. The program makes no claim to teach the physician clinical medicine, they pointed out. Rather, it attempts to orient medical knowledge and experience already acquired to the health supervision of the child at school, they stated.

Augmenting the course, the doctors reported, are seminars on topics of current interest and regular monthly meetings of local groups of school physicians at which school-room medical cases are presented.

A simplified program of school health service is provided student teachers entering their final year of training at the College of the City of New York, Hunter College, and Queens College, they related. Also, school health service has been included as part of public health teaching by the five medical schools of New York City, the doctors said.

At the School of Public Health, Columbia University, a course in school health service theory and practice, staffed by members of the bureau of school health, is given yearly, the doctors stated. Those attending—nurses, physicians, dentists, public health educators, health officers—observe both the elementary and secondary health programs in the schools as part of the course, they said.

### **Chicago Improves Status Of School Nurses**

Chicago's teachers of public school health, or teacher-nurses, now enjoy the same benefits—sick leave with pay, attendance at professional meetings, sabbatical leaves for

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travel or study—as any teacher employed for a 6-hour day, Madeline H. Roessler, R.N., supervisor of health services, bureau of health services, Chicago Board of Education, told the school health nursing section of the American School Health Association. Teacher-nurses are also eligible for regular salary increases, retirement after 20 years of service, and death benefits on a graduated basis, she added.

In 1949, the Chicago public schools were virtually without systematized and effective medical and nursing services, the nurse said. Then a committee of over 40 civic and professional organizations, known as the Joint Committee on Health Services for the School Child, provided a channel for collaboration of volunteer agencies with school authorities.

The Chicago Medical Society "laid the foundation for the teacher-nurse program," Roessler continued, and its child health committee assists the medical director of the board of education's bureau of health services in developing the philosophy of the health program in meeting current needs. The medical and nursing professions and the local dental society have cooperated, "with the interest and active support of the more than a million citizen group."

### *Teacher-Nurse Functions*

The program depends upon existing services and needs, interests, and resources within the school and community, Roessler told her audience. The school principal and the teacher-nurse determine the priority of problems which must be met; and school administrators and teachers cooperate in developing the functions that she must carry out.

These functions include cooperation with the principal in planning and organizing a school health council, acting as a resource person to aid in carrying out the entire school health program, and participation in planning any part of the school curriculum, the speaker said.

The teacher-nurse also gives as-

sistance in providing a healthful physical, social, and emotional environment for the pupil, evaluates the pupil's health status, confers with teachers and pupils in the school and with parents in the school and in the home, and cooperates with other social agencies. She assists in formulating policies for the care of illness and the prevention and control of communicable diseases in the school, and finally, Roessler concluded, she prepares records and reports to provide "continuity of health supervision and for planning and evaluating the school health program."

Applicants for teacher of public health positions complete 2 trial periods, 1 of a month's duration, and the other for a full year. If the bureau of health services so recommends, she is then eligible for examination for a regular certificate. The applicant then takes a major examination prepared by the APHA examination service, a minor examination prepared by local specialists in education and English, and then must pass an oral interview. Presently there are 21 teacher-nurses, 17 teacher-technicians, a medical director, and 2 supervisors in the program. A total of 281 teacher-nurses is the objective.

### **School Physicians' Status And Functions Surveyed**

The results of an inquiry, in 1953, into the status and functions of school physicians were reported by the American School Health Association. As chairman of the committee directing the inquiry, Ruth H. Weaver, M.D., M.P.H., presented information received from 79 cities with populations of 50,000 or more. Dr. Weaver is director of the division of medical services, Philadelphia Board of Public Education.

Summarizing the findings, which were tabulated on the basis of answers to a questionnaire, she stated:

"Unfortunately, not all cities submitted recommendations for im-

provement in the status and functions of school physicians. However, those that did had very definite ideas as to what should be done. Many dealt with the quality of the physicians employed. A few felt that they should be employed full time and should have public health training. Many recommended preservice and inservice training for all school physicians, employment of more physicians, and increase in the rate of pay. Several cities recommended that examinations be encouraged by private physicians."

### *Improvements*

Many suggested improvements in public relations, cited as examples by Weaver, are:

School physicians should give more careful explanations of the health status of pupils to the parents.

The relationship between school physicians and practicing physicians would be improved by more frequent interchange of information. (Sixty-eight cities reported the attitude of practicing physicians toward school physicians as good; 5, as poor.)

A better "teacher-family-nurse observation of pupils" is desirable.

### *Specific Findings*

Specifically, the report tallied their findings, among others, relating to the duties and selection of school physicians:

12 cities require annual physical examinations of school children, but 27 give them every 3 years. (The average time is 15 minutes.) All cities require that pupils undress for examination, usually to the waist. 67 systems give examinations to athletes; 45, to employees.

28 cities immunize their younger pupils.

40 percent of the 79 cities have full-time school physicians, with hours of service varying from 30 to 40 hours weekly.

44 school systems consider physicians' salaries adequate. In 12, the school physician receives more than the health officer; in 10, the same; in 40, less—but information was not recorded for all cities.



72 boards of education pay for their physicians' services.

In 51 cities, the school physician is responsible for coordinating programs for physically handicapped pupils; in 45, for participating in the functions of the school health council; in 38, for "establishing policies for disease control, safety promotion, and so forth," in individual schools. In 28, he consults with the faculties about courses in health education—in 46, he does not.

Other members of the committee

included: I. P. Barrett, M.D. (Fort Worth); Mildred E. Doster, M.D. (Denver); Donald A. Dukelow, M.D. (Chicago); J. F. Hackney, M.D. (Atlanta); William C. Haller (Oklahoma City); and Hermina Hertig, M.D. (Minneapolis).

Also: Paul D. Mossman, M.D. (Seattle); Frank J. O'Brien, M.D. (New York); Charles L. Outland, M.D. (Richmond, Va.); L. L. Tate, M.D. (St. Louis); Don Warner (Omaha); and G. G. Wetherill, M.D. (San Diego).

He noted that no sharp dividing point could be drawn between "immature" and "mature" from the data gathered by this study. Statistical studies that group together all infants who weigh more than 2,500 gm. give the impression that mortality risk suddenly drops after passing the generally accepted upper limit of immaturity—2,500 gm., he remarked. If, however, birth weights are considered in 500-gram intervals, it is apparent that the decline in mortality experience is much more orderly. The relative decline in mortality risk in the weight groups just below and just above 2,500 gm. is about the same, Shapiro said.

"The mortality risk was greatest during the first day after birth regardless of the infant's weight," the investigator noted. "Ability to survive this hazardous period was closely related to the infant's weight, but the advantage that went with additional weight at birth (until reaching the higher weights) was also felt at the end of the neonatal period," he said.

### Mortality Differentials

It has been clear for a long time that mortality risk in early infancy is considerably less for females than for males and also that nonwhite groups run more risk than whites, Shapiro said. Nonwhite babies born in the period under study generally did not weigh as much as white babies, a larger segment of the former group being found among the infants who weighed 2,500 gm. or less, he declared. This weight variation is one of the factors in the difference between the races in the overall neonatal mortality rate. He reported that at low weights of 2,000 gm. or less the risk of loss was substantially lower among nonwhite births during the period immediately after birth. Above 3,000 gm., mortality among white births was far less than among nonwhite from the earliest period of life.

Females generally weighed less than males, but the weight factor was overridden by a more important element, the markedly lower mor-

## Studies on Pregnancy Patterns And Neonatal Loss

*A "pre-conception" clinic established in Syracuse, N. Y., has shown encouraging preliminary results as a specific approach to the problem of fetal wastage. The maternal and child health section also was told of the results of the study to determine if there were patterns of pregnancy other than those commonly recognized. In another presentation, the section heard an analysis of the neonatal loss during the first quarter of 1950. The use of psychiatric techniques in well-baby clinics was described in a third report.*

### Lower Weight Groups Lead In Neonatal Loss

About two-thirds of the infants who died in this country within 28 days after birth (the neonatal period) weighed 2,500 gm. (5½ lbs.) or less, according to a nationwide study of 840,000 babies born in the first quarter of 1950. Results of the study were reported by Sam Shapiro, B.S., chief, Natality Analysis Branch, National Office of Vital Statistics, Public Health Service. Data for the study were obtained from birth and death certificates.

Shapiro reported that about 7.4 percent of the babies weighed 2,500 gm. or less at birth and that another 2.1 percent were in the heavyweight

group of 4,501 gm. (9 lbs., 15 oz.) or more. A great majority of the births, 82.9 percent, occurred at weights of 2,501 gm. to 4,000 gm., with about a third falling in the 3,001-3,500 gm. interval, he said.

"Starting from the very high loss of 7 out of 8 live births under 1,001 gm., the neonatal mortality rate declined rapidly with additional weight," the investigator declared. It reached a low point among babies weighing from 3,501 to 4,000 gm., he said, and cited 5.6 deaths per 1,000 live births for this range. Weight increases beyond 4,000 gm. were a definite liability, and for birth weights above 4,500 gm., the mortality rate was 14.2 per 1,000 live births, Shapiro said.

tality rate among females at almost all weights, according to the author. He suggested that the effect of sex differences in mortality experience might be explained by a search "for inherent characteristics that find their expression in differential rates of development which operate both before and after birth."

It is equally well known that the mortality rate is higher for infants born in plural groups than for those born singly, said the investigator. He found that weight at birth is a decisive element in the overall higher mortality rate for twins and triplets, since plural births are heavily concentrated in the lower weight groups, where the mortality risk is high.

## Psychiatric Techniques Aid Well-Baby Clinics

Knowledge of the child and his behavior, of the common reactions and attitudes of the mother toward her child and the understanding by clinic personnel of how to utilize their own feelings to meet, understand, and accept the child's mother—all are aids which a well-baby clinic can offer in helping mothers, according to Henry H. Work, M.D., associate professor of pediatrics and psychiatry, University of Louisville School of Medicine.

Dr. Work is associated with a study under way in Louisville, where well-baby clinics are currently being used as laboratories for applying mental health knowledge to public health practice. He spoke before a joint meeting with the American School Health Association.

### *Accept the Mother*

Work stressed acceptance of the mother on the part of the clinic staff in its concern with the problems of patients. Many things are involved in the word "accept," he said, and they are manifest in all phases of staff conduct.

As a part of this acceptance, the staff may be perfectly free and generous in offering the mother a chance

to tell her troubles, Work said by way of describing one application of psychiatric knowledge to clinic procedures, "but we are often critical of the way she has manifested them. . . . we often tend to minimize the concerns of the young mother about feeding. We equally tend to be critical of the child's behavior in the clinic. It does not fit our pattern."

In its actions toward mothers, the clinic staff should carry out the friendliness they show in a face-to-face encounter, Work urged. "Much has been written about the arrangement of the clinic to facilitate the ease and comfort of the patients, but it is also important for us to be tolerant of the way that they use the facilities that we provide. We cannot expect rigid order or neatness in the way the mother and child conduct themselves in the waiting situation. Otherwise, our demands may impose a burden on her which interferes with our help to her."

### *Believe the Mother*

Belief in the mother's sincerity in what she relates was also cited by Work as a specific part of the staff's acceptance of the mother and her problems—"very often this takes a little bit of doing."

"She may upset us by entering precipitately," he added, "complaining about a specific disturbance in her child such as a 'knot' in his neck or constipation. She may come in and force the baby upon us, almost giving it to us. It may then become necessary to deal with her immediate concerns at the level at which they bother her. . . . If she feels that we honestly believe what she is telling us, she will accept us better when we say we understand the situation and share it with her. If we can move to that level, she will gain a feeling of comfort, and we will have initiated part of our process of care."

"Certainly psychiatric theory teaches us that without support it is hard to communicate with the mothers," Work said. "But this sincere acceptance is equally important,

both in establishing the support and effecting a responsive change in the patient. We become aware from our knowledge that the mere giving of advice without understanding is of scant avail. It is often deflected from the patient because of her own worries which make her unable to listen. The patient's concern about the child is so great that she feels that we are neglecting her and not listening to her part of the story."

### *Talk About the Problem*

However, the long hours of the psychiatric clinic are not available to the well-baby clinic staff for conferring with the mother and listening to all her problems, Work observed. Therefore, specific knowledge of the common concerns of young mothers and how these concerns relate to the usual problems presented by the growing child are important.

"We are then able more quickly to get down to talking about the particular problem which bothers a particular mother," he pointed out. "The fact that we introduced the subject, the fact that we seem to know about it, and that we are aware that many mothers are beset with the same concern is a definite source of relief to these parents. This applies to everyone who contacts the mother-child combination during their stay in the clinic, but it does become important that the mother make a relationship to one of the members of the clinic staff, be it nurse, physician, or other member of the team, in order to expand her story and give vent to her feelings."

## Fetal Salvage Results Are Encouraging

Progress in solving obstetrical complications will be the key to major fetal and infant salvage, Ferdinand J. Schoeneck, M.D., assistant director of the bureau of maternal hygiene of the Syracuse Department of Health, declared in reporting Syracuse's work on specific obstetrical factors.

The observation made by scientists at the New York Medical Center in Syracuse that glycogen deficiencies associated with many conditions causing fetal loss can usually be corrected by proper hormonal therapy led to the establishment in 1950 of a "pre-conception treatment" clinic in Syracuse, Schoeneck said. A cooperative undertaking of the medical college of the center, the city health department, and the New York State Department of Health, the clinic accepts cases with histories of chronic abortion, recurrent premature labor, and repeated defective offspring, the speaker continued. More specific approaches to the problem of fetal wastage than just prenatal care were needed and the clinic offered one, he felt.

Of the 91 couples seen in the clinic up to October 1, 1953, 33 completed pregnancies after "workup." Fetal loss in this group was 86.4 percent prior to clinic attendance and 31.5 percent afterward, Schoeneck declared. These results, he said, while encouraging, were based on too few pregnancies upon which to draw conclusions—97 against 35.

#### *Pregnancy Patterns*

As the studies continued, a relatively small group of women seemed to account for a disproportionate amount of the fetal loss, Schoeneck reported. To find out if possible whether there were patterns of pregnancy, other than those commonly recognized, the bureau made a study of 5,000 completed pregnancy records from its files. Ninety-three percent of the 776 patients having 5 or more pregnancies were placed in one or another of 5 patterns, he said, noting that:

Of 587 patients, virtually all pregnancies were "normal," that is, not more than 1 abortion, premature, or congenitally defective child in the pregnancy history; 31 patients fell into the group in which virtually all pregnancies were "bad" (75 percent or more); for 29 patients the first 2 or 3 pregnancies were normal while all the others were bad; for 23 the first 2 or 3 pregnancies were

bad and the remainder normal; in a group of 54, the first 2 or 3 pregnancies were normal, followed by 2 or 3 bad ones and the remainder normal; the remaining 54 patients did not fall into a clear-cut pattern.

Schoeneck said that a running study is now being made of every patient in Syracuse hospitalized with a pregnancy diagnosis to devise methods for recognizing women who will develop bad pregnancy patterns and treating them before the patterns develop. Data is also being

gathered on the menstrual history and conception-time effort, he said.

"It may be possible, eventually, to determine those women who would develop bad pregnancy patterns by a correlation of the menstrual and conception-effort data with the outcome of their early pregnancies," Schoeneck stated.

Recognizing that many other approaches are necessary to gain a complete solution, he offered "this approach as a method of attacking a very serious problem of fetal loss."

## The Specialty Board Selection Of Public Health Diplomates

*Certification of diplomates in the field of preventive medicine and public health is comparatively new in the specialty field. It was not until 1948 that the American Board of Preventive Medicine and Public Health was incorporated. In the clinical field there are 17 specialty boards, the first—the American Board of Ophthalmology—dating back to 1917. In a panel discussion at the APHA meeting three members of the American Board of Preventive Medicine and Public Health gave details on the selection of the specialists and analyzed methods of examining the candidates—some 600 of them by this time. Ernest L. Stebbins, M.D., director of the Johns Hopkins University School of Hygiene and Public Health, and secretary of the board, presided at the discussion.*

### Board's Formative Years; Test Methods Reviewed

The American Board of Preventive Medicine and Public Health was born of a conviction that this field is a well-developed and defined specialty deserving equal recognition with the clinical specialties, William P. Shepard, M.D., third vice president of the health and welfare division, Metropolitan Life Insurance Company, told the panel session.

Shepard reviewed the formation of the board and outlined the examination techniques. The principal

purposes of the board, Shepard said, are to encourage the study, improve the practice, elevate the standards, and advance the cause of preventive medicine and public health; and to grant and issue to physicians, duly licensed by law to practice medicine, certificates of special knowledge in the public health field.

In addition to meeting the board's requirements of basic training in medicine, internship, licensure, post-graduate training in public health, and supervised field training and experience, the candidate's performances in a written test and an oral interview are evaluated, he said.



The written test is designed to examine the candidate's knowledge and judgment in his field, he explained. The oral test is given to rate his attitude towards his professional interests, his maturity, significant personality traits, and intangible characteristics not measurable by a written objective examination—to evaluate, in short, the qualities of mind, appearance, and character which would reflect the standards of the board.

## *Objective Method Chosen*

For the written test, Shepard said, the board believes the advantages of the objective method outweigh those of the traditional essay test. Objective tests sample a wider range of knowledge than can be covered by an essay test—especially important in a broad field with candidates offering a heterogeneity of background, he pointed out. Answers can be graded right or wrong by a fast accurate mechanical device, thus eliminating subjective factors in scoring. And statistical procedures can be used effectively in evaluating the test.

The method of test preparation is painstaking and exacting, Shepard declared, but it yields a product of high quality—the questions are rooted in actual public health experience. They are valid and authoritative and conform to sound testing practices.

Several hundred public health specialists participate in the development of this phase of the certification process, Shepard observed. Subject-matter specialists supply the questions, and after test specialists put them into proper form, authoritative persons in public health review them. Their comments and criticisms form the basis for final revision of the questions.

The first written test of 400 questions, given to 37 candidates in Washington, D. C., May 14, 1949, Shepard related, covered the areas of administration, communicable diseases, environmental sanitation, statistics, maternal and child health, and public health laboratory. The number of questions was reduced to

310 for the following sessions, since the test was obviously too long to take in one day. The three subsequent major revisions of the test have been based on statistical analysis, on changes in the candidate population admitted to the examination, and on the reactions of candidates and board members to the examination, Shepard observed.

## *Oral Interview Method*

In the oral interview, limited to 25 minutes, the candidate is rated on eight traits and a final overall evaluation is made of his general fitness, Shepard related. Several devices, he said, are used to achieve comparability among different oral boards. Examiners are given an orientation period and they use a standard guide and rating sheet, he explained. Examiners are instructed, he said, to make their judgments independently of other board members and to evaluate each candidate in terms of the examiner's concept of the average candidate admitted to the examinations.

## **Analysis Can Weigh Validity Of Objective Examination**

In presenting the board's approach to the passing or failing of candidates for the public health specialty, Richard F. Boyd, M.D., regional medical director of the Public Health Service, San Francisco, pointed out that the objective type of test used lends itself admirably to statistical analysis. Thus, the question of "how good is the test?" can be answered with some accuracy, he said.

The members of the American Board of Preventive Medicine and Public Health have always been as critically disposed toward the test as have the candidates, Boyd reminded. They have analyzed the objective method, the validity of the individual questions, the subject matter coverage, and the methods of scoring.

## *Not Too Difficult*

For one thing, Boyd said, the test is not too difficult as some board

members assumed. On the average the 419 candidates examined during the first 5 test sessions answered only 69 to 77 percent of the questions correctly, but most of us, he said, were brought up in the tradition of the 70 percent passing score.

Test specialists hold that an average score of 50 percent is ideal, Boyd explained. In tests of this difficulty level, the scores tend to fall into a normal distribution curve, tapering at the top and bottom and concentrating toward the middle as did the scores of the candidates analyzed.

The consistency of the average percent scores in all the subtests for the first five examining sessions indicates that the examiners have succeeded in keeping all subject matter areas of the test at about the same difficulty level and that the quality of the candidates has remained constant, Boyd said.

The public health laboratory area, representing a body of knowledge of greater specialization within the public health field than the other areas, is the most difficult the score analysis showed. Nevertheless, Boyd said, candidates qualify for specialty status because of experience in the laboratory field, and this fact has been recognized in examination content.

At the outset, Boyd related, it was decided that no absolute and fixed score should be set as the passing point, but that every case would be given individual consideration and that the final decision would be based upon the information in the application form, the written test scores, and the oral rating.

## *Groups Demarcated*

An analysis of the results showed, he said, that only two persons who scored at or above the written average had been failed. Seven out of the bottom 10 percent (32 persons) had been passed. There was an area in the written test, however, between the raw scores of 200 and 224 questions answered correctly in which the candidate's chance of passing was 50-50.

This seemed to mark off a good borderline group on which the board should concentrate, Boyd stated. Thus, it was decided that the general practice would be to pass all candidates answering 225 or more of the written questions correctly (those scoring in the upper 60 percent of the candidate population or answering 73 percent of the questions correctly). Generally, all candidates whose written scores were 199 or less (those scoring in the bottom 10 percent of the candidate population or answering 64 percent or less of the questions correctly) would be failed, he said. Intensive individual consideration would be given to the group falling between these two points.

This general procedure has been followed in subsequent examining sessions, with the board retaining the right to single out any individual that any member might request for more intensive evaluation, Boyd said.

Individual examination questions were evaluated, Boyd explained, by determining how well each question discriminated between groups of candidates who made high and low scores on each of the separate tests. About 77 percent of all the questions in all of the tests differentiated significantly (at the .05 or .01 level) between high and low scorers, he said. The .05 level of significance, he explained, means that the correct answers would be selected by the high scorers on a chance basis only 5 times in 100.

### Probes Characteristics Of the Diplomate

Some of the characteristics of candidates for specialty certification were indicated by analysis of 262 of the candidates taking the first examination form given by the American Board of Preventive Medicine and Public Health.

V. A. Van Volkenburgh, M.D., assistant commissioner of the division of local health services, New York State Department of Health, out-

lined the results of relating scores on the test to age, years of training and experience in public health, and type of work in which the applicant was engaged at the time he applied.

The average scores of the candidates, both on the written test and on the oral test, decreased with age, Van Volkenburgh said. The percent of failure ranged from none in the 31-34 age group to 60 percent in the 55-59 age group.

### Founder's Group the Bias

Van Volkenburgh attributed this finding to the fact that during the first administration of the test candidates considered by the trustees to have exceptional qualifications were certified without examination under the "grandfather" clause. The candidates over 40, included in the analysis, generally did not fall into the especially qualified category and were required to take the examination, he said. Thus, he stated, this finding does not indicate that the older a candidate is the less likely he will be to possess the knowledge and ability measured by this test.

Similar results were found, Van Volkenburgh said, in relating years of training and experience to scores, since these factors are related to age.

The average subtest scores when related to type of public health work yielded some significant differences, Van Volkenburgh said. The six subtest areas analyzed were health protection, environmental sanitation, communicable disease, public health laboratory, public health practice, and background knowledge.

In health protection, the maternal and child health group scored significantly higher than the general health administration and communicable disease groups, the next high scorers in this area, he said.

The communicable disease group score was highest in the communicable disease and public health laboratory areas. In the laboratory area, the general public health administration group scored significantly higher than the maternal and child health group.

Applicants from the armed forces, Van Volkenburgh stated, were less competent in the health protection, public health practice, and background knowledge areas than were all other groups of candidates, accounting for the high failure rate in this group.

### Aviation Medicine Included

In concluding the panel discussion, Van Volkenburgh reviewed various test revisions and described the current examination.

"Form I, revised, was given for the last time in April 1951. Following this administration of the test, all new material was used in four areas, with public health laboratory and background knowledge retained intact in order that the difficulty level of the new material might be evaluated against the old. This form was again extensively revised in 1952 as form III," he said.

Form IV, prepared in November 1952, has been expanded to a 500-item test, administered on 2 days, Van Volkenburgh said. The impetus for the new examination arose primarily from the decision of the board to certify specialists in aviation medicine, he explained, adding that these applicants could not be expected to take the same examination as those who come from the public health field. On the other hand, he said, all persons certified by the board should have a certain area of knowledge in common.

Consequently, he said, the first day is devoted to a core examination covering mental health, nutrition, oral health, environmental sanitation, occupational health, communicable diseases, venereal diseases, and laboratory practice—areas in which the examination committee considers that all applicants should qualify.

On the second day, public health applicants will answer questions on maternal and child health, chronic diseases, tuberculosis, and public health practice. The aviation medicine section, to be given in the fall of 1954, will cover that particular field.

## Addenda . . . 11 Papers

*Although the following papers, which vary in subject from the principles of expenditures control to water-in-oil adjuvant vaccines used in influenza prevention, were received too late for inclusion in the classified sections, the editors feel that in each case there was good reason causing the delay and accordingly have provided for some coverage. [They were placed in this section after the preceding sections were set in type.]*

### North Carolina Studies Physician Resources

Reliable data are the cornerstone of intelligent planning for public health, or any field, declared Rashi Fein, research associate, program planning section, division of health affairs, University of North Carolina. Fein discussed methods used to obtain and assess data to determine physician resources in North Carolina, saying the methods can be applied to any geographic area.

Fein said these questions were the objectives of the North Carolina studies: Where are the physicians located? With what other factors is this geographic distribution associated? What effect will the particular physician-age distributions found have upon future supply and distribution of physicians? How may available physician resources, such as medical students, influence future supply and distribution?

#### Methods and Findings

To determine future physician resources, life expectancy figures were applied to the present physician population, Fein said. The probability of survival of each age group of physicians in each county was calculated for 1957, 1962, and 1967, making it possible to determine how many physicians would be needed to replace those who retire or die. Data on the county level were also related to statistics on the distribution of medical students and to some basic socioeconomic variables.

Fein then summarized the results of the North Carolina studies:

The distribution of physicians is variable—some counties have many in relation to population; others, few.

Counties having the lower physician-population ratios also have the old physicians and are thus "poor" today and will be even more so 5, 10, and 15 years hence.

Counties with the greatest replacement needs are sending the least number of students to medical schools.

Counties standing low on the indexes of number of physicians and number of medical students are the rural counties that also stand low on the basic socioeconomic indexes of family income and proportion of youths in school.

The annual number of physicians graduating from the three medical schools in the State will just balance the number needed to keep the physician-population ratio constant for the State as a whole—they will just take account of replacement needs and population growth.

Some of the results were neither unexpected nor strikingly new, Fein said. The usefulness of the studies lies in the availability of a more complete summary of information.

### Water-in-Oil Adjuvant Vaccines Evaluated

Significantly lower acute febrile respiratory illness attack rates during an outbreak of influenza B were noted 13 weeks after vaccination

among persons vaccinated with B/Lee or B/Va./1/50 vaccines than similarly administered type A vaccines in a study reported to the laboratory section.

Robert N. Philip, M.D., Joseph A. Bell, M.D., Dorland J. Davis, M.D., Marc O. Beem, M.D., and Paul M. Beigelman, M.D., of the Laboratory of Infectious Diseases, National Microbiological Institute of the Public Health Service, made the report.

They pointed out their report was a preliminary one based on studies initiated in Norfolk, Va., in 1951 and extended to include Arlington, Va., families in 1952. The purpose of the studies, they said, was to obtain definitive information on the public health importance, epidemiology, and clinical characteristics of influenza as it occurs in general population families as well as to evaluate the effectiveness of water-in-oil adjuvant vaccines. They reported these results:

In Norfolk, where 2,364 persons were observed for occurrence of acute febrile respiratory illness during 1951-52, the lower attack rate previously mentioned was noted. In addition, influenza virus was recovered from significantly fewer persons receiving the B/Lee or B/Va./1/50 vaccines than from persons who received PR8 or A/FW/1/50 vaccines.

During an influenza A outbreak, 1,870 persons were observed 60 weeks after vaccination for occurrence of respiratory illness. Acute febrile respiratory illness attack rates were lower among individuals who received A/FW/1/50 vaccine than among persons vaccinated with A/PR8, B/Lee or B/Va./1/50 vaccines. The fewer isolations obtained in A/FW/1/50 vaccinated persons gave additional support to the thesis that some persons were immune 14 months after vaccination.

In Norfolk, 848 persons were vaccinated one month before the onset of an influenza A outbreak. The incidence of acute febrile respiratory illness and frequency of virus isolations were lower among persons who



received A/FW/1/50 than A/PR8 or type B vaccines. In Arlington, 1,150 persons were vaccinated at the onset of an influenza A outbreak. No protection, as evidenced by incidence of acute febrile respiratory disease and frequency of virus isolations, was afforded the A/FW/1/50 vaccinated group.

### Michigan Dental Students Used in Summer Program

Michigan permits employment of dental students and student hygienists in topical sodium fluoride programs conducted during the summer under the direction of the Michigan Department of Health.

Students alleviate the shortage of qualified personnel and enable operation in the many communities requesting the program, according to Fred Wertheimer, D.D.S., M.P.H., chief of the public health dentistry section, Michigan Department of Health.

Community requests for the topical fluoride program, following the demonstrations of the first unit in 1948, soon exceeded the available supply of qualified personnel, Wertheimer explained. In the early program, recently graduated, part-time, and even retired dentists and hygienists were used, he said, and in some communities local dentists volunteered until regular personnel could be obtained.

#### *Students Fill the Bill*

A successful try-out of a junior dental student in a 1949 program for the children of Michigan State College students led to the organization of summer programs and expanding employment of student operators, Wertheimer related. Treatment of 3-year-olds by this student, who had no previous experience, also proved that topical fluoride applications can be given this age group, he declared.

By the summer of 1953, operators totaled 37—15 dental students, 20 student hygienists, and 2 graduate

hygienists, he stated. They conducted programs in 116 centers, located in 27 counties, and gave fluoride treatments to about 16,000 children. Most of the programs included preschool children, and five programs treated this age group exclusively, Wertheimer reported.

The average student works 9 to 10 weeks and treats between 500 to 600 children, he said, with each child getting 4 fluoride applications.

#### *Finances Work*

Wertheimer pointed out that communities assigned a program agree to continue it from year to year. They pay the salaries of the operators and order and pay for the supplies and equipment, he said, although the State health department lends equipment until the local area can arrange its purchase. The average community, charging a fee of \$3 a child for the four applications of fluoride, can usually purchase a partial set of equipment after the first summer and a full set after the second summer, he said. Students, he reported, have been receiving \$60 a week.

Further community responsibilities, Wertheimer said, are: to determine case potential and inform the community of benefits of treatment; decide the age groups to be included; send out consent cards; locate housing for students; hire an assistant or arrange for volunteers; arrange with local dentists to supervise students; and prepare schedules and make appointments.

The State health department procures student operators, arranges for a permit from the Michigan State Board of Dentistry, and conducts a 2-day orientation course for the students. It also acts as consultant, supervisor, and guide, he said.

Wertheimer pointed out that although the summer topical fluoride programs cannot be coordinated into the regular school activities and participation is not as great as during the school year, adequate space is readily obtainable in the school

building, and the student personnel supply a service that could not be provided otherwise.

### Health Service Training For Non-M.D.'s

Training programs leading to a degree and the locus for such programs within the university were discussed by S. J. Axelrod, M. D., associate professor of public health, University of Michigan School of Public Health, before the Association of Business Management in Public Health.

In the school of business administration, he said, many tools of the trade are acquired, such as office management, accounting, property control, and personnel administration. The emphasis, however, is on managerial skills and techniques, and training is geared to the needs of business enterprise, he said. Axelrod cited the graduate training for hospital administration in this connection and stated that leaders in this field are indicating growing dissatisfaction with this type of business-oriented training. The central purpose of the hospital, he said, is overlooked by hospital administrators overly concerned with managerial functions, building maintenance, cost accounting, and efficient laundry systems.

A graduate department of political science or public administration was cited by Axelrod as another alternative for training non-M.D. health administrators. Current curriculum in these departments deals with more general aspects of administration such as organization, planning, personnel administration, budget and fiscal control. This program is oriented toward public service rather than private enterprise, he said.

In the past, the speaker noted, schools of public health restricted study in administration to physicians or to certain qualified non-M.D. administrators, but the latter were shunted to the field of health educa-

tion, hospital, or medical care administration. At the University of Michigan, he reported, this field has now been opened to non-M.D.'s as well as physicians.

The Michigan school also has inaugurated an undergraduate training program for the non-M.D. health administrator, training students for general health service administration. A 4-year program, it leads to a degree of bachelor of public health. Requirements for the physical and biological sciences have been reduced, Axelrod said, and a balanced curriculum provides a mixture of social science, general administration, business management, and public health content. Two to three months in supervised field training are required between the junior and senior years.

### Cites Applied Principles Of Expenditures Control

John G. Steinle, M.S., management engineer, Cresap, McCormick, and Paget, of New York, speaking before the Association of Business Management in Public Health, emphasized the importance of spending public funds where need is greatest and of obtaining value for the taxpayer's dollar. Budgeting, he said, governs the first function. Performance evaluation governs the second.

He cited as an example of performance evaluation a study of an organization that had a number of clinical laboratories doing similar work, and he described the methods used to obtain and evaluate objective data. Such a study, he said, applied to comparable situations.

He recommended another technique when the character of each operation tends to be unique, as in nursing. This technique consisted of the study of a day-to-day record of operations. He suggested that the technique of relating workload to man-hours of performance can be used effectively for determining the stability of performance of many operating departments.

### Combined Nursing Service In Columbus, Ohio

The combination public health nursing service in Columbus, Ohio, "results in more adequate nursing for the citizens" and "is satisfying to the nurses," declared Mabel E. Grover, R.N., M.A., executive director of the Instructive District Nursing Association of Columbus.

Tracing the development of the combined service, a function of the Columbus Department of Health and the Instructive District Nursing Association, from its establishment in 1922, Grover described in detail its reorganization and strengthening in 1947. In that year, she reported, a committee made up of department of health and I.D.N.A. board members and the health commissioner concluded an agreement which included statements on the general purpose of the combination plan and described administrative authority, method of budget preparation, and personnel policies.

This agreement also provided that the executive director of the I.D.N.A. be loaned to the Columbus Department of Health to be the chief of the division of public health nursing, thus placing the responsibility for the combined service under the supervision of one nursing director, Grover pointed out.

Other major changes after 1947 listed by Grover included: (1) extension of public health nursing service for care of the sick and maternal and child health guidance to an area outside the city; (2) writing of an agreement for transfer of home nursing care for cancer patients to the generalized service; (3) reorganization of the parochial school health services; and (4) building of a Health and Safety Center.

Grover indicated that the reorganization followed recommendations made as a result of a survey of health services in Columbus in 1942. The survey, in which 100 citizens of Columbus participated, she acclaimed

as "the kind of healthy exercise that gave the citizens first-hand information about community needs so they could help to put the suggestions and recommendations . . . into practice."

### Analyzes Results of Surveys Of Premature Babies

Summarizing the findings of three European surveys of premature babies, V. Mary Crosse, M.D., Dr. P.H., consultant pediatrician, Birmingham Regional Hospital Board, and lecturer in child health and pediatrics at the University of Birmingham, England, concludes that "premature babies born free from incurable malformations are well worth saving."

Considering the findings of these surveys in regard to growth, physical and mental handicaps, health, and social adjustments, she stated, it would appear that the only hazards of prematurity itself are: (1) a relatively high mortality up to the age of 2 to 3 years; (2) an increased susceptibility to infections during the first 2 years of life; and (3) a slightly increased risk of intracranial birth injury and kernicterus and a greatly increased susceptibility to retrolental fibroplasia. Good obstetric and pediatric care can prevent some, but not all, of these complications, she added.

"If a premature baby is born free from congenital defects and escapes birth injury and asphyxia and neonatal complications, prematurity per se does not seem to alter the normal course of development if an allowance is made for the degree of prematurity," Crosse maintained.

The surveys on which Crosse based her presentation included a long-term survey of all premature babies (1,598) and every sixth baby weighing more than 5½ pounds at birth (2,974), born alive or dead in Birmingham during the year following July 1, 1948; an investigation by Alm in Sweden of 999 premature boys and 1,002 controls (also boys) born

in Stockholm hospitals between 1902 and 1921; and a national maternity survey in Great Britain covering all births in England, Scotland, and Wales during the week of March 3-9, 1946.

### Los Angeles Integrates Building Inspection

For a joint meeting of the engineering section and the Conference of Municipal Public Health Engineers, Charles L. Senn, M.S., engineer-director, bureau of sanitation, Los Angeles City Health Department, described the conclusions drawn from his city's efforts to improve inspection services with respect to housing. The following statements are excerpts from his address:

"In almost every city and county there are periodic movements to 'eliminate overlapping and duplication of inspection services.' . . . As the health department sanitation program acquires engineering direction, there is an increasing trend toward 'invasion' of the field of building and safety officials. A second overlapping jurisdictional unit assumes responsibility for reviewing plans and establishing standards for design, construction, and installations. Unless the program is carefully coordinated, the public is faced with one extra barrier, needless referrals from one office to another and the necessity of obtaining approval from an extra, sometimes conflicting, group of regulatory officials.

"A review of the progress of municipal public health sanitation programs reveals a gradual adaptation of fundamental engineering concepts to improvement of the environment. When preventive sanitation is practiced on a sound public health engineering basis, the program tends to impinge upon the work of agencies responsible for reviewing plans and supervising construction and installations.

"For instance, emphasis in rat control is shifted from poisoning and trapping to ratproofing, requiring changes in the design and construction of buildings. Development of design and installation standards for hot water systems for machine dishwashing imposes new requirements upon plumbers who may be under building department jurisdiction. Sanitation standards for floors, walls, and ceilings, and plumbing and equipment installations in all types of food and milk plants, written into health codes, do not come to the attention of architects and engineers who look to building, not health departments, for design and construction requirements.

"Effort of sanitarians and engineers, formerly devoted to abating nuisances from overflowing cesspools, is diverted to the review of subdivisions and approval of plans to encourage or require adequate private sewage disposal systems. Cross-connection surveys and elimination of insanitary fixtures like vertical jet drinking fountains tend to encroach upon the work of the agency responsible for the original plumbing installations. A broad housing inspection program, and the concept that health departments should be officially concerned with home safety, add to the problem of overlapping jurisdictions. Ordering improvements and repairs to defective stairs, handrails, and floors, elimination of hazardous wiring, and securing installation of adequate ventilation and plumbing, all tend to impinge upon the responsibilities of building and safety and fire prevention officials.

"The question is then asked, is the local sanitation program predominantly an engineering, planning, and design program?

"... For routine sanitary maintenance of a community, there should be systematic inspection of all types of premises, especially in blighted, commercial, and industrial areas. . . .

"... The health department must

continue to be primarily responsible for 'disease control,' but this factor is dwarfed by insignificance in comparison with the more tangible potential benefits from a comprehensive, integrated housing enforcement program. . . .

"Recognizing that the actual field inspection work must be done by a number of different specialists, the principal question is, in accordance with the division of work by purposes of the governmental agency, should the administrative unit which directs the environmental sanitation program be part of the 'health' function or part of a 'building, safety, and maintenance inspection' function?

"... With proper coordination, inspection and regulatory programs can function smoothly and effectively when handled by a number of different departments.

"As the first step, all legal requirements for construction and installation should be clearly specified in the codes enforced by the agency legally responsible for approving plans and for supervising installation. Otherwise health department representatives are in the unenviable position of requiring changes in buildings and installations approved by another local department. Health departments should not narrowly confine their interests to disease control, but should be willing to assume functions administratively related to their work but which will not necessarily control disease. This broad concept of the scope of the job enables the health department to carry out the type of housing inspection programs which practically eliminate the need for 'overlapping' inspections by other departments.

"On the other hand, the health department administrator must be willing to agree that officials of other agencies might properly handle some functions that directly relate to this broadly conceived environmental sanitation program, but which can best be administered in connection with other regulatory programs."



### Sanitary District's Part In Urban Growth

Drawing on the experience of Detroit, where a Metropolitan Area Regional Plan Commission has divided the 2,000 square mile area into 20 groups which have been called development areas, Morton S. Hilbert, C.E., director of engineering, Wayne County (Mich.) Health Department, discussed the advantages of such districts for water, sewage, drainage, and refuse control. Among other points made before the engineering section, he mentioned that insistence on excessively large lots in suburban areas may put a prohibitive price tag on the cost of serving the area with adequate utilities.

In closing, he said:

"With the numerous types of local government, the wide variations of State law and the diverse nature of local problems, it is not possible nor desirable to develop a pattern for solution to sanitary problems which could be applied to all metropolitan areas of the Nation. There are, however, certain basic essentials which can well be considered in searching for solutions to the water supply, sewage disposal, and garbage and rubbish disposal problems of metropolitan communities. These include: (1) the need for health authority participation in promotion and planning of the necessary solutions; (2) the extensive use of planning agencies in the development of suitable methods of meeting the problems; (3) a thorough understanding by the public of the need and the development of a desire on the part of the general population to do something about the problem; (4) the organization of a program of improve-

ment which will be more than remedial in nature—one which will consider the long-range needs of the community; and (5) a plan for the protection of the public health, safety, and welfare which will be the most economical and which can be administered in an impartial area-wide basis."

### Analyzing the Costs Of Health Units

Summarizing his paper for the Association of Business Management in Public Health, Clemens W. Gaines, B.A., chief of the bureau of management, Maryland State Department of Health, said:

"We have costs of human values, costs of personnel time, and costs in units of dollars. We have analysis interpretation and presentation for various purposes and to various audiences. We have a moral obligation and responsibility to organize ourselves in such a way as to be able to make these analyses so that they will be accurate, timely, and meaningful, and so that they will indicate practical conclusions and solutions, all cast upon the basic philosophy under which our departments operate. I believe this is a very new field of interest for health department administrative personnel.

"I would caution that as each of us develops his own system for accomplishing these analyses, the denominators which are many fold in each category may lack uniformity among the several jurisdictions, so that as we progress we cannot only derive units of quality and quantity of service for a particular period or for that period compared to prior

periods within our own jurisdictions, but we also may as the years go on be able to compare these with the same denominators among the several jurisdictions. Without comparability of denominators such efforts will be impossible."

### Role of Sanitary Inspection In United Kingdom

A raising of educational requirements for sanitary inspectors in the United Kingdom and a broadening of their duties and responsibilities since the position was created in 1848 were emphasized by A. Denton Ogden, M.B.E., chief sanitary inspector and director of public cleansing to the Rural District Council of Chelmsford, England, and chairman of the Royal Sanitary Institute.

Specifying that sanitary inspectors must be qualified for appointment by examination, he listed the requirements which a candidate for examination must meet, including educational qualifications, theoretical training, and practical training.

The benefits of an ever-increasing standard of education are reflected in the caliber of the officer of today and in the work of our public health departments, he stated.

Ogden summarized the more important functions of the sanitary inspector, dividing them into 18 different categories. He pointed to the deterioration of house property due to the lack of proper maintenance as a particularly serious problem for sanitary inspectors today.

The text of Ogden's paper appeared in the December 1953 issue of the *American Journal of Public Health*.



# Mass Radiography In the United States In 1952

**B**ETWEEN 1946 and 1950, the annual volume of group chest X-ray examinations increased from 6 million to 14.8 million (1). Since 1950, however, a decrease in this activity has been noted. Reports received by the Division of Chronic Disease and Tuberculosis of the Public Health Service indicate that during 1951, only 12.5 million chest X-rays were taken in the continental United States. This increased to 13.4 million in 1952—which is still well below the peak observed in 1950.

The accompanying table shows the number of X-rays taken in each State and Territory during 1952 and the cumulative number taken since reporting to the Public Health Service was first initiated for the period beginning July 1, 1947. These are the figures which have been reported to the Public Health Service by the States and Territories on the semiannual tuberculosis reports (PHS-1394) and the annual tuberculosis report (PHS-1393, Rev. 1-52) forms. For this report, X-ray case-finding activities are defined as "any group X-ray examinations, regardless of size of film, conducted primarily for screening purposes (for detecting pulmonary pathology)."

Information was requested from each State regarding the number of individuals examined during the year within the State and the number of cases of tuberculosis newly reported during the year as the result of X-ray case-finding activities. As well as could be determined, X-ray case-finding activities reported by the States exclude X-rays taken by the Armed Forces and the Veterans Administration so that the data reported primarily represent services to residents of the State or area reporting.

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*This report was prepared by the program analysis section of the Division of Chronic Disease and Tuberculosis, Public Health Service.*

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Column 3 of the table shows the percentage of the population X-rayed in each State and Territory in 1952, while column 4 shows the average annual percentage X-rayed during the entire 5½-year period. For all the States and Territories, 8.7 percent of the population was examined in 1952—about the same as the average annual percentage examined during the 5½-year period. Five-and-one-half-year averages ranged from a high of 27.9 percent for the District of Columbia and 23.0 percent for the State of Washington to 3.4 and 3.6 percent for New Jersey and Pennsylvania, respectively.

The data shown for the percentage of population X-rayed annually may be somewhat overstated because some persons receive more than one X-ray during a single year. However, since it is generally recommended that chest X-ray examinations be made annually, it is unlikely that the number of repeat X-rays is very great in any one year. Moreover, the extent to which the percentages are overstated is probably about the same from one State to another, so that State by State comparisons would seem to be valid.

The effectiveness of X-ray programs depends to a large extent on the followup and diagnosis of suspects identified during the course of these activities. For the year 1952, 42 States and Territories were able to furnish information regarding the amount of tuberculosis diagnosed as the result of group chest X-ray activities. An average of 1 new reportable case for every 500 X-rays taken was reported. This varied greatly from area to area—from about 1 case per 10,000 X-rays in Utah and Wyoming to more than 1 per 100 in 3 areas.

To some extent, these wide differences may be accounted for on the basis of actual differences in prevalence from one area to another. However, there are other important factors which influence these reported yield figures, including variations from one area to another in the intensity and completeness of efforts to obtain final diagnoses on suspects found in chest X-ray programs, and the relative difficulty encountered by the various reporting areas in differentiating survey-discovered cases from other newly reported cases of tuberculosis.

**Chest X-ray examinations and percent of population examined, United States and Territories, 1947-52**

State or Territory	Total X-ray examinations, 1952 <sup>1</sup>	Cumulative total X-ray examinations, July 1947-Dec. 1952 <sup>1</sup>	Percent of population <sup>2</sup> examined 1952	Average annual percent of population <sup>3</sup> examined
Alabama.....	142, 246	964, 864	4. 7	5. 7
Arizona.....	61, 710	572, 676	7. 2	13. 9
Arkansas.....	168, 530	1, 039, 550	9. 0	9. 9
California.....	872, 579	6, 547, 709	7. 7	11. 2
Colorado.....	139, 235	941, 999	9. 7	12. 9
Connecticut.....	170, 768	927, 720	8. 1	8. 4
Delaware.....	19, 063	127, 914	5. 6	7. 3
District of Columbia.....	344, 068	1, 229, 303	41. 2	27. 9
Florida.....	382, 004	2, 279, 810	12. 3	15. 0
Georgia.....	248, 822	1, 640, 138	7. 1	8. 7
Idaho.....	72, 370	176, 864	11. 9	5. 5
Illinois.....	1, 022, 507	4, 042, 869	11. 5	8. 4
Indiana.....	281, 508	1, 716, 354	6. 9	7. 9
Iowa.....	257, 138	890, 140	9. 7	6. 2
Kansas.....	155, 002	821, 284	7. 7	7. 8
Kentucky.....	254, 252	1, 195, 723	8. 7	7. 4
Louisiana.....	375, 563	1, 444, 353	13. 3	9. 8
Maine.....	97, 381	351, 172	11. 0	7. 0
Maryland.....	238, 996	1, 225, 882	9. 5	9. 5
Massachusetts.....	213, 938	2, 302, 265	4. 5	8. 9
Michigan.....	468, 378	2, 201, 820	7. 0	6. 3
Minnesota.....	355, 312	2, 423, 640	11. 8	14. 8
Mississippi.....	197, 947	1, 178, 290	9. 1	9. 8
Missouri.....	220, 047	1, 127, 583	5. 4	5. 2
Montana.....	69, 076	395, 041	11. 7	12. 2
Nebraska.....	113, 058	608, 871	8. 2	8. 4
Nevada.....	0	38, 253	0	4. 3
New Hampshire.....	39, 502	167, 385	7. 3	5. 7
New Jersey.....	176, 848	891, 149	3. 5	3. 4
New Mexico.....	25, 638	311, 553	3. 5	8. 3
New York.....	864, 607	4, 501, 972	5. 7	5. 5
North Carolina.....	483, 549	1, 760, 968	11. 6	7. 9
North Dakota.....	65, 650	392, 743	10. 9	11. 5
Ohio.....	815, 847	4, 353, 257	10. 0	10. 0
Oklahoma.....	225, 478	1, 286, 035	10. 0	10. 5
Oregon.....	374, 622	1, 471, 169	23. 5	17. 6
Pennsylvania.....	814, 997	2, 063, 353	7. 6	3. 6
Rhode Island.....	80, 410	434, 080	9. 8	10. 0
South Carolina.....	132, 574	806, 022	6. 2	6. 9
South Dakota.....	64, 070	350, 902	9. 6	9. 8
Tennessee.....	540, 256	2, 652, 607	16. 6	14. 7
Texas.....	427, 869	2, 618, 698	5. 2	6. 2
Utah.....	69, 682	408, 085	9. 5	10. 8
Vermont.....	7, 130	87, 726	1. 9	4. 2
Virginia.....	436, 087	2, 129, 408	12. 5	11. 7
Washington.....	409, 874	3, 003, 051	16. 6	23. 0
West Virginia.....	142, 259	624, 539	7. 3	5. 7
Wisconsin.....	293, 658	1, 506, 871	8. 3	8. 0
Wyoming.....	34, 124	137, 777	11. 1	8. 6
Total United States.....	13, 466, 229	70, 371, 437	8. 6	8. 5
Alaska.....	16, 249	101, 355	8. 9	14. 3
Hawaii.....	127, 021	622, 992	24. 3	22. 7
Puerto Rico.....	252, 685	1, 212, 064	11. 3	10. 0
Total United States and Territories..	13, 862, 184	72, 307, 848	8. 7	8. 6

<sup>1</sup> X-rays taken in 1952 from annual tuberculosis reports (PHS-1393, CDT). X-rays taken from July 1947 to December 1951 from semiannual tuberculosis reports (PHS-1394, TB). <sup>2</sup> Column 1 as percent of population estimated as of July 1, 1952, from Current Population Reports, Population Estimates, Series P-25, No. 70, U.S. Bureau of the Census. <sup>3</sup> Column 2 ÷ 5½ as percent of April 1, 1950, census count.



Group chest X-ray examinations contributed materially to the number of new cases of tuberculosis reported in the United States and Territories during 1952. In the 42 States and Territories which furnished such data, mass radiographic activities produced 25 percent of all newly reported tuberculosis for that year. Thus, it might be estimated that, of the 118,000 cases newly reported in the United States and Territories during 1952 (2), nearly 30,000 were

reported as the result of group chest X-ray examinations.

#### REFERENCES

- (1) Enterline, Phillip: Group chest X-ray examinations and the tuberculosis death rate. *Pub. Health Rep.* 67: 762-766 (1952).
- (2) Final 1952 report on tuberculosis morbidity, United States and Territories. *Pub. Health Rep.* 68: 1116-1117 (1953).

## technical publications

### How Many General Hospital Beds Are Needed?

*Public Health Service Publication No. 309. By Louis S. Reed and Helen Hollingsworth. 73 pages; tables. 25 cents.*

Basic to all community planning for hospital services are standards of the number of hospital beds per unit of population required for the provision of adequate health care. The need of hospital services, in terms of beds required, is neither fixed nor static. Rather, it is constantly changing as a result of changes in the incidence and prevalence of illness, the accepted techniques of medical diagnosis and treatment, the practices of physicians and the public in the use of hospitals, the nature of hospitals and hospital care, composition of the population, and many other factors.

The purpose of this publication is to examine once again the available data on the number of general hospital beds needed in this country and to reappraise bed needs in relation to population. Following a chapter on past estimates of hospital beds needed for general care, the paper discusses existing beds and volume of service and estimates the volume of service needed and beds

required to meet the true need for hospital care. The conclusions are that for provision of adequate care, on the basis of current levels of service, 4.4 to 4.7 beds per 1,000 population would be required for persons needing diagnosis and active treatment and another 2.3 to 2.6 beds per 1,000 population in general hospitals, chronic disease hospitals, and nursing home type facilities for persons needing nursing and convalescent care but not active medical treatment.

Appendixes include tables showing the total general hospital beds in the United States by region and State, and general hospital beds per 1,000 population in various other countries.

### Techniques of Tuberculin Testing and BCG Vaccination

*Public Health Service Publication No. 182. 44 pages; illustrated. 55 cents. (Available only from the Superintendent of Documents.)*

In July 1950, the first laboratory was licensed by the Public Health Service for the manufacture, export, import, and sale of BCG vaccine. Thus BCG is available to health officers and clinicians who wish to use it as a vaccination for those persons

who are especially exposed to tuberculous infection.

The purpose of this publication is to describe and explain certain tested techniques of BCG vaccination and the tuberculin testing that precedes and follows it, and to aid in the careful and efficient operation of testing and vaccination programs.

The introduction to the manual discusses the BCG program and the staff and equipment that are essential to the conduct of such a program. The sections on tuberculin testing and BCG vaccination include care of the solutions and vaccines and step by step procedures for the two operations. Illustrations, taken from the film, "Techniques of Tuberculin Testing and BCG Vaccination," accompany the outline of procedures. A list of equipment needed and selected references are included in the appendixes.

This section carries announcements of all new Public Health Service publications and of selected new publications on health topics prepared by other Federal government agencies.

Publications for which prices are quoted are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Orders should be accompanied by cash, check, or money order and should fully identify the publication (including its Public Health Service publication number). Single copies of most Public Health Service publications can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington 25, D. C.